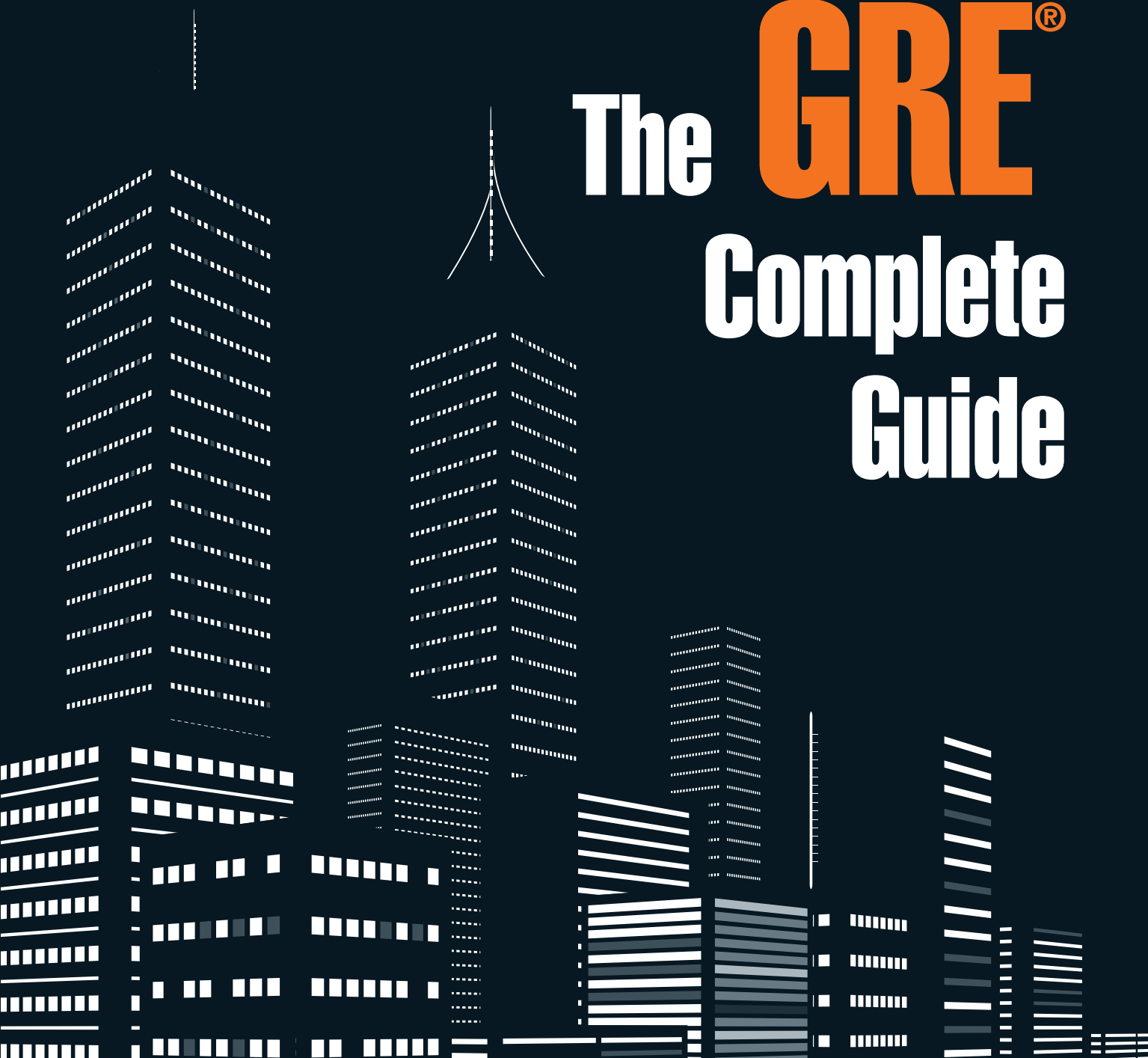


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Manhattan Review™

The **GRE**®  
Complete  
Guide



ALWAYS LEARNING

PEARSON

# Manhattan Review

## **The GRE® Complete Guide**

**PEARSON**

Delhi • Chennai

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*Dedicated to*  
*Late Mr A. Srinivas Girikanth*  
(Former Head of the R&D Department)

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# PREFACE

Hearty congratulations for choosing this book to enhance your GRE® score.

By choosing this book, you have made a right start to beginning your preparation for GRE®. We will work with you closely to achieve the score you aspire for. We encourage you to attend all the classes regularly. It is important that you take the mock tests at the recommended time to ensure that you have a chance to monitor your progress during the course of your training. Our expert trainers will guide you in properly exploiting your strengths to help you achieve the top score. We will hone your skills and help you achieve better results. The 10 simulated tests that are included as part of your training will help you get a feel of the actual test so that you do not face stress during the actual test. We offer 50 verbal and 50 quantitative practice tests online in addition to the sectional tests that will be conducted at regular intervals to assess the intensity of your preparation.

In addition to this book, we provide our students handouts, which will help them to get hands on additional study material. The handouts are updated frequently to reflect the latest question types that are tested on the GRE®. Our classes are PowerPoint based. The strategies taught in the classroom will help you prepare thoroughly and comprehensively. These classroom interactions will provide ample scope for discussions, which will help you clarify any questions you may have. This will add to your confidence in tackling the test.

We have assisted many students, like you, to get top scores on the GRE®. Our well researched and up-to-date material coupled with the classroom training, which is customized to meet the general needs of the diverse group of students that approach us for training, will help you get the top scores, a dream of many students. You can complete the full cycle of the journey you started by consulting our admissions services department for free counselling on shortlisting the right schools that fit your profile and on the process of applying to the schools to ensure that you get admission into your dream schools.

We wish you good luck on the GRE®.

Your success is our prime concern.

Team Manhattan



### ***Why Do I Need to Take the GRE®?***

Those who plan to go abroad for graduate school, will have to take the GRE®. The GRE® is a standardized test intended to measure the abilities of all graduates in tasks of general academic nature, regardless of their fields of specialization. In the US and other English-speaking countries many graduate schools need the GRE® test score for admission into their programs. Your score is used to evaluate your verbal and quantitative skills and whether you are eligible for any financial assistance. However, the weightage given to the score varies from school to school. It all depends on the program and the department you chose. Basically your admission will depend not on a single factor but on a complex mix of various factors.

### ***Will Studying Abroad Make a Difference?***

Yes! Studying abroad can be professionally and personally satisfying. Global competence is tough. But with it come your way ample opportunities to succeed in life. It will help you to stand out and be different from others.

When you are placed out of your comfort zone in a far off continent, you will learn to live independently. This will increase your self-confidence. You will learn to adapt yourself to new people, culture, environment, food and language. It is an immensely enriching experience in life. The ‘frog in the well’ mentality will be done with.

## ***Why You Need This Book***

To compete in a performance-driven world, you have to focus on building and developing your core competencies at hand. That is where this book will come to your help. The book is structured in such a way that it provides a helping hand at each stage of your preparation.

The book is loaded with strategies and tips to prepare you for the test day. All the details on the new GRE® pattern are included to enable you to adapt to the new changes.

Salient features of AWA verbal reasoning and quantitative reasoning sections are provided followed by detailed analysis of each section.

The verbal reasoning guide covers basic grammar concepts and nuances of writing. This book includes effective strategies to tackle the issue and argument tasks and provides special techniques to build vocabulary. It goes without saying that building a rich vocabulary will help you answer the verbal section of the GRE® test with great ease. Time-tested strategies and tips to solve sentence equivalence and text completion questions have been included. Critical reasoning section is dealt with very comprehensively. It is supplemented with well-developed practice tests. The reading comprehension passages included in the book cover a variety of topics and are challenging. All the question types are included. The questions included in the practice exercises are developed keeping in mind the requirements of the new GRE® test pattern.

The quantitative section of the book is all inclusive. Inclusion of cheat sheet which is a concise set of notes used for quick reference is of a great help to both math and non-math students. An in-depth topic-wise and sub-topic-wise analysis is done of all the concepts included in the revised GRE®. Every topic that the test covers is explained with suitable definitions and examples. Well-researched and validated strategies used in solving different types of problems are included to help the test taker to face quantitative section confidently and successfully.

The book includes basic drills in every topic for both verbal and quantitative sections. Tips provided on every page serve as a ready reckoner. Practice tests included in the book provide opportunities to apply the key concepts. The two full-length tests will prepare the student to face D-Day.

This book holds the key to your success.

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# CHAPTER 1

## Introduction to the GRE<sup>®</sup> Revised General Test

Education Testing Services (ETS) has announced a major change in the GRE<sup>®</sup> General Test pattern which is effective from August 1, 2011. ETS states that the test is updated to better reflect the skills that are needed to succeed in graduate programs in science and business schools. The test is now called, ‘Computer-based GRE<sup>®</sup> revised General Test.’

### *The Major Changes Relate to*

- The test format.
- The content of all the three sections (verbal, quantitative, and analytical writing).
- The grading scale for verbal and quantitative sections.
- The facility to skip questions within a section and come back to those questions later.
- The provision of a calculator on the quantitative reasoning section.

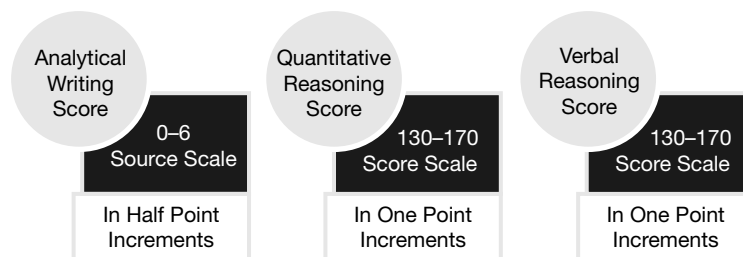


#### **Tips**

The GRE measures the general academic ability of the student.

### *New Test Scoring Scale*

The scoring scale for verbal reasoning and quantitative reasoning sections will be 130–170 with score increments of one point. The scoring scale for the analytical writing section will remain the same i.e., 0–6 with increments of half point.



## Overview of the New Test Format

- One analytical writing section with two separate writing tasks. The duration for each task is 30 minutes.
- Two verbal reasoning sections with 20 questions in each section. The duration for each section is 30 minutes.
- Two quantitative reasoning sections with 20 questions in each section. The duration for each section is 35 minutes.
- One unidentifiable, un-scored experimental section on either verbal reasoning or quantitative reasoning, which may appear at any point in the test.
- Instead of the un-scored, unidentifiable experimental section, you may come across an identifiable un-scored research section. If an identifiable research section is administered, it will always appear at the end of the test.

## Key Points to Remember

- The test is computer based and section adaptive.
- Your performance in the first verbal and the first quantitative section will determine the questions that will appear in the next verbal and the next quantitative sections, respectively.
  - You will get a one-minute break after every section.
  - You can take a 10-minute break after the third section.
  - There is no negative marking.
  - All questions carry equal weightage.



### Tips

In all, the GRE revised general test has 6 scored sections: One analytical writing section with 2 essays to be typed, two verbal reasoning sections and two quantitative reasoning sections and one experimental or research section.

Section	No. of Questions in Each Section	Time Limit for Each Section
Analytical writing (1 Section)	2	60 min
Verbal reasoning (2 Sections)	20	30 min
Quantitative reasoning (2 Sections)	20	35 min

## Salient Features of the Analytical Writing Section

- The analytical writing section will always appear as the FIRST section of the test.
- There are two writing tasks: An issue task and an argument task.
  - The time allocated for each task is 30 minutes.
  - You must provide a precise and focused response based on the directions that follow each task.
  - In the issue task, a topic of general, and intellectual interest is given. You must respond to the given issue keeping in mind the specific instructions.
    - Analyze the given issue from various perspectives and type a response that is supported by valid reasons and/or examples.
  - In the argument task, analyze the line of reasoning presented in the given argument, and decide if it is logically correct. Your response should be based on the directions provided.



### Tips

The test has an additional, experimental section that is not scored. You will not be able to identify which section is the experimental section. You may get an identifiable research section instead of the unidentifiable experimental section.

## Salient Features of the Verbal Reasoning Section

- There will be TWO sections consisting of three question types: Sentence equivalence, text completion, and reading comprehension.
- **Sentence equivalence** questions comprise a sentence with one word or phrase left out. The sentence is followed by six answer choices. You are expected to choose two answer choices, one at a time which fits the blank perfectly within the context of the sentence. The two sentences thus formed using the two answer choices must have the same meaning. If you get one of the answers right and the other wrong, you will not get any credit for that question.
- **Text completion** questions consist of one to five sentences with one, two, or three blanks. There will be five answer choices for questions with only one blank. Only one word from the given answer choices will fit the blank correctly. There will be three possible answer choices for each blank for questions with two or three blanks. Only one word from the given answer choices will fit each blank correctly.
- **Reading comprehension** questions are of three types:

**Type-1:** Single answer questions—Select only one answer that is correct among the given five answer choices.

**Type-2:** Single/Multiple answer questions—Select one or more correct answer choices from among the given three answer choices.

No credit is given for partially correct answers. Hence, all your answer choices must be correct for you to receive credit for the question.

**Type-3:** Identify and click the sentence that answers a particular question.

In this format of the GRE® general test, the lines of the passages are not numbered. Instead, the relevant part of the passage, on which a question is set, is highlighted.

## Salient Features of the Quantitative Reasoning Section

To solve questions on quantitative reasoning, you must be familiar with high school level arithmetic, algebra, geometry and data analysis:

- There will be TWO sections consisting of four broad question types: Quantitative comparison, numeric entry, multiple choice with five options for which you have to choose one option, and multiple choice with three options for which you have to choose as many options as are right.
- In quantitative comparison questions, you will notice two columns marked column A and column B. You have to decide whether
  - (a) The value of the expression in column A is greater than the value of the expression in column B.
  - (b) The value of the expression in column B is greater than the value of the expression in column A.
  - (c) Both the values are equal.
  - (d) The value of the expression in column A has no meaningful relationship with the value of the expression in column B.



### Tips

There is a difference between being able to read words and to comprehend text.



### Tips

Analyze the question type.

**Tips**

In quantitative reasoning questions, do not perform unnecessary calculations. See the options and decide the extent of calculation needed. Decide whether you can approximate an answer.

Therefore, quantitative comparison questions have FOUR options.

- In numeric entry questions there are no choices. You have to key in the answer in the box/boxes provided.
- In multiple choice questions with five options, you can choose only one option that is the most accurate.
- In some multiple choice questions you have to choose as many options as are right from a set of choices. There can be only one correct choice or all of the choices could be correct, depending on the type of question.

# **PART I**

# **VERBAL REASONING GUIDE**



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# CHAPTER 2

## Writing Mechanics for AWA

### **Writing Mechanics for AWA**

Knowing the basics of grammar is essential to effectively answer the verbal reasoning section in R-GRE®. Such knowledge will also help in the analytical writing section. Keep the following concepts in mind to express yourself efficiently and correctly:

#### **Verb Agreement**

1. A singular subject is followed by a singular verb and a plural subject is followed by a plural verb.  
*Example:* Baby cries.  
Babies cry.
2. (a) When two nouns are joined by ‘and’ the verb is plural.  
*Example:* Anthony and David are our new recruits.  
(b) If two singular nouns are joined by ‘and’ and express one idea, the verb is singular.  
*Example:* Bread and butter is what I want.
3. ‘Each’ and ‘every’ are followed by singular verbs.  
*Example:* Each boy and girl has to submit his/her marks card before Monday.  
Every dog has its day.
4. When two subjects are joined by either-or, neither-nor, not only-but also and the subjects are of different persons, the verb will agree in person and number with the nearest noun.  
*Example:* Neither John nor Gina is attending the marriage.  
Either Susan or her friends are responsible for this confusion.
5. When two subjects are connected with connectives like ‘together with’, ‘along with’, ‘accompanied by’, the verb agrees with the first subject.  
*Example:* The mayor, along with her supporters, is expected to arrive shortly.



#### **Tips**

We associate grammar with errors and correctness. Knowledge of grammar helps us to understand what makes sentences and paragraphs clear, interesting, and precise.

6. Collective nouns are followed by singular verbs unless the sentence indicates that the individuals are acting separately.

*Example:* The team is prepared to face the challenge.  
The members of the team are tired.

7. Use of a number of /the number of

(a) 'A number of' is followed by a plural verb.

*Example:* A number of students are late to the class.

(b) 'The number of' is followed by a singular verb.

*Example:* The number of students in the class is fewer than yesterday.



### Tips

Without following the rules of grammar, it is difficult to communicate clearly.

Identify the subject of a sentence to confirm subject-verb agreement.

8. Words which indicate parts (percent, fraction, part, majority, some, all, none, remainder, etc.) use a singular verb, if the object of the preposition is singular and plural verb, if the object of the preposition is plural.

*Example:* Twenty percent of the cake is eaten.

Twenty percent of the cakes are made of chocolate.

9. When we refer to the players of a country, a plural verb is used.

*Example:* Americans have won the basketball championship.

10. The sums of money and duration of time take singular verbs.

*Example:* Hundred dollars is a huge amount.

Ten years is the minimum period for this health policy.

## Exercise: 1

Fill in the blanks using the correct choice from the words given in brackets:

1. It is the mayor, not her ideas, that \_\_\_\_ (has/have) provoked the students to riot.
2. The boy, along with his classmates, \_\_\_\_ (is/are) planning to go for a swim in the afternoon.
3. Two-thirds of the population \_\_\_\_ (has/have) voted during the Presidential elections.
4. Smith Pearson, together with his teammates, \_\_\_\_ (present/presents) a formidable challenge to the opponent on the tennis court.
5. Each and every resident of this building \_\_\_\_\_ (hope/hopes) for a new facility by next year.

## Pronoun Agreement

### Pronoun Reference



### Tips

To choose correctly from among the forms of 'who', re-phrase the sentence. Use 'whom' or 'who' accordingly.

Usually a pronoun refers to either a noun or another pronoun that comes before it in a sentence.

*Rose and Suzanne went shopping and she lost her purse.*

Here, the use of the pronoun is ambiguous; it is not clear whether the pronoun *she* refers to Rose or Suzanne. A pronoun must refer distinctively to the noun or pronoun it refers to.

- A pronoun should refer to a specific antecedent.

## Pronoun Ambiguity

*The problem of pollution is increasing, and it is doubtful whether they will ever be able to control it.*

Here, the use of the pronoun is ambiguous: It is difficult to ascertain to whom ‘they’ refers.

- Should not refer to possessive nouns or adjectives.

**Note:** Do not use adjectives, or nouns, or pronouns in the possessive case as antecedents.

*Tina’s attendance was in question; it revealed that she rarely attended the college.*

*It*, here, is ambiguous and could point both to *question* and the *attendance*; whereas, it should actually refer to *Tina’s attendance*.

### Points to Remember:

1. (a) While expressing a positive idea, the sequence of personal pronouns is (second person, third person, first person).

*Example:* You, Andrew, and I will be sharing the honors for best performance.

- (b) While expressing negative ideas, the sequence of personal pronouns is (first person, second person, and third person).

*Example:* I, you, and Roberts have to face punishment for our wrong doings.

2. When a singular and a plural noun are combined with connectors like ‘either-or’, ‘neither-nor’, the ‘pronoun’ agrees with the nearest noun.

*Example:* Either the captain or the members have to cast their vote.

3. The pronouns such as each, everyone, everybody, anyone, everybody, someone, and somebody are singular and take singular verbs.

*Example:* Each of the boys was given a watch.

4. The use of relative pronouns.

(a) Who—used for persons.

(b) Which—used for infants, small animals, and objects.

(c) That—used for persons, animals and things.

5. A relative pronoun always agrees with its antecedent in number, gender and person.

*Example:* He is one of the novelists who have been chosen for this year’s award.

6. Each other/One another.

Each other is used for two persons.

One another is used for more than two persons.

*Example:* These two sisters always help each other.

These institutions never agree with one another.



#### Tips

‘They’ and ‘their’ are plural pronouns, and can’t be used as gender-neutral singular pronouns.

## Exercise: 2

Rewrite the sentences removing the ambiguity in the use of pronouns.

1. After Susan loaded the new program on the computer, it crashed.

---

2. The documents filed by the temporary assistants were out of order, so they were all sent back to the main office.

---

3. The workers' union lobbied for additional insurance, which won them praise among workers.  
\_\_\_\_\_
4. Agnes is forwarding the airline tickets of the two clients, one of which has been confirmed.  
\_\_\_\_\_
5. In Bond's new movie, he falls off a mountain cliff.  
\_\_\_\_\_

### Verb Tense

It is important to maintain the tense of the verb in a sentence:

1. Use simple present tense to refer to
  - (a) Habitual actions.  
*Example:* I drink tea in the morning.
  - (b) Truths/facts.  
*Example:* Cats drink milk.
  - (c) For a planned future action.  
*Example:* The school re-opens on June 10.
2. Do not use present continuous tense with
  - (a) Verbs of perception: See, hear, smell etc.
  - (b) Verbs denoting possession: Own, belong, possess.
  - (c) Verbs of feelings: Love, hate, forgive.
3. Use present perfect with 'since' and 'for'.  
*Example:* My sister has lived in Bombay since 1990.  
I have waited for twenty years before taking this decision.
4. Use simple past with time expression.  
*Example:* I graduated in the year 2011.
5. When two past actions are shown in sequence, use past perfect with the earlier action.  
*Example:* After reaching office, I realized that I had forgotten my house keys in the car.
6. Use simple future tense to denote
  - (a) Intention  
*Example:* We will leave the place in the morning.
  - (b) Prediction  
*Example:* There will be heavy snow storm today.



#### Tips

Change verb tenses only when there is a real change in time.

### Active and Passive Voice

Active voice is more direct and concise than passive voice:

1. To change passive voice to active, the doer of the action should be identified.
2. If the doer is in a *by the* phrase, the doer should be placed just before the verb. If the doer is not stated, then choose a subject that fits the context.

*The test results will be announced in a couple of days.*

The above sentence can be rewritten as

*We will announce the test results in a couple of days.*

3. Active and passive voice should not be used together in a sentence.  
*Someone found the lost wallet, and the police was informed immediately.*

In the above sentence, the first half of the sentence is active, but the second half is passive.

### Exercise: 3

Rewrite in the following sentences in active voice:

1. Not before the survey responses have been collected and tabulated will it be possible to know the population statistics.

---



---

2. The near extinct species were found in the search, steps have been taken to rehabilitate them.

---

3. For any further queries, I can be reached at 121-987655-098.

---

4. The latest draft has been attached, and the corrections are highlighted.

---

5. The report should be approved by the supervisor before it can be finalized by the manager.

---

### Parallelism

Parallelism is the arrangement of identically structured words in a series of related phrases or clauses. It improves the readability and clarity of the sentences. The repetition of syntactical similarities in passages gives a rhetorical effect; it also lends wit and emphasizes the meanings.

Parallel structures can be used with elements joined by coordinated conjunctions, with elements in a list or in a series, with elements being compared, with elements being joined by a linking verb, and with elements joined by correlative conjunction. Items in a series must have the same grammatical form.

*Example:* The teacher checked the notes, the project, and the thesis.

*Example:* You cannot expect me to read or to write when I do not have my spectacles.

### Exercise: 4

Rewrite the sentences to fix parallelism errors.

1. A novice actor should learn how to memorize his lines and getting into the character of the play.

---

2. Alicia's daily exercises include brisk walking, swimming and to lift light weights.

---



#### Tips

Passive voice is preferred when the doer of the action is unknown or unimportant.

Sentences with intransitive verbs cannot be changed to passive voice.



#### Tips

Faulty parallelism can be avoided, if a clause in passive voice is preferred.



#### Tips

The logical structure of a sentence is destroyed because of faulty parallelism. Put in a little effort to overcome this problem.

3. Mary Jones is looking forward to graduating from high school in June and attend college in the fall.

---

4. Antonio could not divide his time between his family and work.

---

5. Plagiarism can lead to a failing grade for the semester or bring a failing grade for the course.

---

### ***Dangling Modifiers***

Modifiers are used to enhance the meaning of a given concept. Adjectives and adverbs are used as modifiers. When they fail to modify the word or concept stated, they are called ‘dangling modifiers’.

*Example:* Having finished dinner, dishes were loaded into the dish-washer.

### ***Points to Remember***

1. The introductory phrase should modify the subject of the main clause.
2. Place the modifier right next to the word it modifies.

### ***Exercise: 5***

Rewrite after correcting the dangling modifiers:

1. Having written carefully, the essay was submitted.

---



---

2. At the age of ten, my grandfather taught me to swim.

---



---

3. To achieve great heights, good grades are essential.

---

4. Driving along the road, the peacock came into view.

---



#### **Tips**

Modifiers can confuse or distort the meaning of a sentence when used improperly.

## Usage and Style

Effective expression is an important quality. Express yourself in fewer words and directly.

The shorter the sentence, the better it is.

### Points to Remember:

1. Avoid long drawn sentences.
2. Be as direct as possible.
3. Use active voice as it is more common in English.

## Comparisons

1. As much as/as many as/as few as/as little as.
  - (a) 'As many as' and 'as few as' are used with countable nouns.  
*Example:* He has as many as ten houses on his name.  
Randy has as few problems as James has.
  - (b) 'As much as' and 'as little as' are used with uncountable nouns.  
*Example:* I cannot speak as much as Samson can, on this issue.  
My daughter is eighteen, but eats as little as a child.
2. More/less  
'More' is used with countable nouns and 'less' with uncountable nouns.  
*Example:* Randy has more friends than Albert.  
Bradman is less comfortable playing football than cricket.
3. Between/among.  
Between—used to denote a position between two things.  
Among—used when speaking about more than two things.  
*Example:* Between you two decide who is going to complete the work.  
Is there anyone among you who disagrees with what I say?



### Tips

Some adjectives such as - empty, excellent, circular, unique, universal, final, last, perfect, etc., are not used in the comparative or superlative forms.

## Exercise: 6

Fill in the blanks with the appropriate word.

1. The commotion caused by the absence of the minister was so \_\_\_\_\_ (much/many) that no one could bring things under control.
2. All the members decided that they would share the expenditure incurred for lunch \_\_\_\_\_ (between/among) themselves.
3. The number of arguments against the policy were \_\_\_\_\_ (fewer/lesser) than what the ministers expected.
4. You may wish for it \_\_\_\_\_ (as many as/as much as) you want, but it will not be yours.



## A Note on Articles

**Articles** are generally placed before singular countable nouns to indicate the kind of reference attributed to those nouns.

There are two types of articles: Indefinite (a, an) and Definite (the).

**Indefinite Article:** ‘A’ and ‘an’ are used before singular countable nouns.

**A** is used before a word starting with a consonant sound.

*Example:* A boy, a tiger, a European, a University, a one-day match.

**An** is used before a word with a vowel sound.

*Example:* An apple, an egg, an injection, an owl, an umbrella, an hour, an honest man

1. ‘A’ and ‘an’ are not used before plural nouns, uncountable nouns and before names of meals.
2. ‘A’ used before ‘most’ to indicate the extent of something.

*Example:* It is a most tragic event.

3. Used in phrases, (in a daze), before certain numbers (a hundred).
4. Used to make a proper noun a common noun (John is a Milton).

*The definite article ‘the’ is used where we talk of*

1. Some persons or things in particular or one already referred to.

*Example:* The girl in the blue skirt is my sister.

2. (a) Objects of unique nature.

*Example:* The sun, the moon, the sky.

(b) Names of Oceans, Seas, Gulf, Rivers, Mountains ranges and groups of islands.

*Example:* The Pacific, the Red Sea, the Gulf of Mexico, the Amazon, the Alps, the Hawaiian islands.

3. Names of books/epics.

*Example:* The Bible, The Quran, The Ramayana.

4. Names of directions.

*Example:* The north of this country is densely populated.

5. Names of musical instruments.

*Example:* The guitar, The piano.

6. A singular noun meant to represent a whole class.

*Example:* The rich should help the needy.

7. Superlative adjectives.

*Example:* The best policy in such situations is to keep quiet.

8. Comparative adjectives used at the beginning of a sentence.

*Example:* The richer men usually tend to be hardworking.

*The more, the merrier.*

9. Before names of countries which are unions of smaller countries.

*Example:* The U.S.A, The U.K

10. Used before ordinal numbers.

*Example:* The first, the last



### Tips

‘The’ does not mean all. To talk about things in general, we usually use no article.

11. Before names of historical places.  
*Example: The white house*
12. Used before names of political parties and dates.  
*Example: The Labor Party, the Republicans*  
*The 11<sup>th</sup> June 2011*

## Omission of the Article

### Omit the Article

1. Before a proper noun.  
*Example: Janice is beautiful.*  
*Exception:* When one proper noun is used to compare with another proper noun of the same class, *the* is used before the second noun.  
Janice is the Marilyn Monroe of our class.
2. Before material nouns. However, used when there is reference to the material noun in particular.  
*Example: Gold prices have doubled over the last two years.*  
The gold bangle you bought from Dubai is costly.
3. Before abstract nouns.  
*Example: Honesty is the best policy.*
4. Before names of languages, but used to indicate nationality.  
*Example: English is not a phonetic language.*  
The English are particular about the way English is spoken.
5. Before *bed, college, church, hospital, market, prison, school ...* When these places are visited or used for their primary purposes.  
*Example: I go to church on Sunday.*  
When we talk of them as a definite/specified place, building or object we use *the*.  
*On Sunday we go to the Methodist church.*
6. Before names of relations like *father, mother, aunt, uncle, when used in a general way.*  
*Example: My uncle is very rich.*
7. Before nouns denoting a unique position i.e. a position that is normally held at one time by one person only.  
*Example: He was elected chairman of the Board.*
8. In certain places such as *...at home, on demand, underground, by train, at dinner, to catch fire, to lose heart, to take offence, etc.*
9. Before common nouns which denote the largest group.  
*Example: Man is mortal.*
10. Before the names of meals.  
*Example: We had breakfast only at 10 in the morning.*  
However, it can be used to talk about a particular meal.  
*Example: The lunch you served was very delicious.*



#### Tips

Do not use an article before the names of countries except where they indicate multiple areas or contain the words state(s).



#### Tips

Do not use articles with continents, towns and streets.

### Repetition of the Article

When two or more adjectives refer to the same noun, the article is used before the first adjective only: but when they qualify different nouns, expressed or understood, the article is used before each adjective.

- Example:* 1. *I have a black and white television.* (Refers to one television only).  
 2. *I have a black and a white dog.* (Means two dogs, one black and the other white).

### Apostrophe

An apostrophe is used for contractions. It is a mark used to indicate the omission of letters or figures, the possessive case or the plural of letters or figures.

- Possessive case: A grammatical case that denotes ownership.  
*Example: mine, my, ours, yours.*
- Possessive case is not used with inanimate objects.  
*Example: Car's wheels (incorrect). The wheel of the car (correct).*
- An apostrophe is placed before the *s* to show singular possession and after *s* to show plural possession.  
*Example: Woman's bag, child's bugle, poetess's book.*  
*Kings' jewels, poetess' books.*
- The apostrophe is used where the noun that should follow is implied.  
*Example: This is her mother's, not her necklace.*
- For a singular compound noun, use the apostrophe at the end of the word. For the plural compound noun, the apostrophe should be used after the noun is changed into plural.  
*Example: My father-in-law's ancestral property.*  
*My brothers-in-laws' bikes.*
- If two proper nouns are joined by 'and' and common possession is indicated, the apostrophe comes after the second name.  
*Example: Abel and Jane's contract will expire next week.* (Shows combined possession).  
*Abel's and Jane's houses are located on the riverside.* (Shows individual possession).
- An apostrophe should not be used with possessive pronouns as they already show possession.  
*Example: Hers, his, whose, its, ours, yours, whose, theirs.*
- An apostrophe should not be used for plurals of capital letters and numbers which are used as nouns.  
*Example: The child was taught his ABCs.*  
*The 1920s, not 1920's.*
- Words which end in 's' or 'ce' possession is denoted by putting the apostrophe after 's'.  
*Example: Moses', Holmes', Charles'.*
- To indicate possessive case in a title, the apostrophe is added to the last word.  
*Example: The president of America's speech.*



#### Tips

Use the possessive case with the names of personified objects.

# CHAPTER 3

## Analytical Writing

### Introduction

The AWA section is the first to appear on the *GRE® revised General Test*. You are expected to type the response to the two different tasks: an ‘Issue’ task and an ‘Argument’ task. The time for each task is 30 minutes.

**In the 30-minute Issue task** a comment in the form of a quotation is presented. The comment is of a general, intellectual nature and is followed by specific instructions about the particular manner in which you are expected to respond. Within the framework of these instructions, evaluate the Issue topic and its complexities, present your opinion, and develop your ideas by using valid reasons and/or examples to support the position you take.

**In the 30-minute Argument task** you will be presented with an argument, that consists of a claim and supporting evidence. You have to evaluate the line of reasoning presented as per the instructions that follow the argument. Note that you are not being asked to present your opinion about the subject matter in the argument; rather, you have to analyze and understand the underlying logic that has been presented.

In an Issue essay, you build your own argument about the given topic by using convincing evidence. On the other hand, in an Argument essay, you examine the conclusion, and the quality of the evidence given to support the conclusion. In your response, discuss the quality of the rationale presented, based on the specific instructions that follow the argument.

The topics covered in the analytical writing section may encompass various subjects such as the physical sciences, technology, history, art, and social sciences. However, the analytical writing section is not a test of knowledge on any of these subjects. Awareness of general issues, an ability to view the issues from different perspectives, skill in presenting ideas persuasively and the ability to develop the ideas effectively will help you fare better in this section.

It is important to note that there is no single correct answer to any of the essays. An opinion about any issue is bound to be subjective. Your essays should have clarity and should convince the reader. The evaluators should get an overall (holistic) impression about your writing skills.



#### Tips

The Analytical Writing Section will ALWAYS appear as the first section of the GRE revised General Test.

**Tips**

Your GRE AWA score will show the average of the Issue and the Argument tasks.

You need not be unduly worried about perfection in your writing. Evaluators understand that you are under stringent time constraint and hence they will view your essay from the perspective of a reasonably articulate first draft. Your ability to develop and organize ideas and your command over the English language will be mainly evaluated. In addition, be forewarned that essay-similarity software is used to check whether the essays can be traced to another candidate's essays or to any other source. Therefore, it is not wise to bank on cramming essays written by someone else.

### ***The Scoring Criteria and Method Adopted for Assigning a Score to the Analytical Writing Section***

Both the essays are rated on a scale of 0 to 6. The score card will not show separate scores for the Issue task and the Argument task. A single score, which is the average of the score in the Issue and the Argument tasks, is indicated. For example, if you score 5 in the Issue task and 6 in the Argument task, the score card will indicate a score of 5.5 on the analytical writing section.

### ***Strategies to Tackle the AWA Task***

#### ***Instructions that Follow the Issue Task***

An Issue task is followed by certain instructions. You must organize the content for the task in accordance with the instructions given. The instructions could be as follows:

**Tips**

Essay evaluators are not looking for perfection. Occasional typos, spelling mistakes and grammatical errors will not lower your score. Strive for proper analysis and clarity of expression.

- Read the given information and state whether you agree or disagree with it. Be sure to support your stand with sound reasoning. Support your ideas and state why you agree or disagree with a particular idea.
- Explain your stand with suitable and convincing examples and give reasons why you support or oppose the statement.
- Explain the stand you have taken. Provide the support to help you to argue in favor of the position you have taken.
- State why the idea mentioned is not convincing enough, if you oppose it, or why it is convincing if you support it.

Remember that there is no right or wrong answer. The evaluator focuses on your ability to respond to the instructions given and how you approach and develop your argument.

#### ***Instructions that Follow the Argument Task***

The instructions that follow an argument could be as follows:

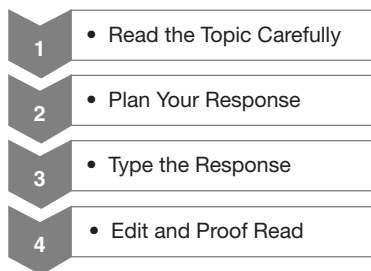
- Discuss the information required to evaluate the argument and explain how the information will help to strengthen or weaken it.
- In your response explain what is implied in the argument and how the implications help to prove or disprove the statement.
- Discuss the questions that need to be addressed before deciding on whether the recommendations made in the argument are reasonable. Your answer should help to evaluate the recommendations made in the argument.

- Identify if the statement proposes any suggestions and decide on what questions need to be answered to determine the validity of those suggestions.
- Explain whether the issues that have been raised and the results expected are reasonable.
- Discuss alternative approaches that could strengthen or weaken the argument. Support your approach with factual information.
- Comment on the conclusion drawn in the argument. Evaluate the conclusion and state if it is reasonable.

### ***How to Respond to the Analytical Writing Tasks***

The broad steps for responding to both the essays remain the same. However, the style adopted while addressing an Issue differs from that of an Argument. These steps are illustrated here.

### ***The Four Broad Steps for Both the Tasks***



### ***Implications of the 4 Steps for the Issue Task***

In your response to the Issue task, feel free to adopt any style. You may first evaluate the different aspects and then state your position or, first state your position and then support that position with proper reasons. You are free to agree or disagree completely, or partly with the given issue. Support your stand by using valid reasons and/or examples. Use information based on your academic studies, non-academic readings, observations and experiences. View the topic from different perspectives and never forget that your response to the issue must be based on the specific instructions that follow the Issue topic.

#### ***I. Read the Topic Carefully***

While reading the Issue topic, ask yourself the following questions:

- Is it only a single issue or are there multiple issues?
- What is the main subject?
- What is the comment about the main subject?
- What are the key words?



#### **Tips**

Be direct, simple and crystal clear in your thoughts. This will ensure that your writing has more clarity.



#### **Tips**

Avoid high-sounding vocabulary.



#### **Tips**

Spend about five minutes to proof read and edit what you have written.

Check errors pertaining to:

1. Subject-verb agreement.
2. Parallelism.
3. Pronoun referent.
4. Apostrophes.
5. Spellings.

- How are the key words connected?
- What does the overall issue mean?
- What does the author claim?
- Will it be better to define some term(s)?

You may want to paraphrase the topic to understand it better.

## 2. Plan the Response



### Tips

Ensure that in a paragraph, each sentence is individually clear and all the sentences together have unity. A reader should be able to move smoothly from one sentence to the next.

At this stage, think about how you want to put across your views. This may mean asking yourself certain questions:

- Do you agree with the given claim?
- Do you completely agree, completely disagree, or only partly agree with the given claim?
- Is it better to define some term(s) so that the reader understands your points better?
- Is the claim relevant only in some situations?
- Is the author ‘assuming’ something that is questionable?

### After this

- Make a note of the points on the sheets provided.
- Arrange your points in a logical order.

## 3. Type the Response

Use the conventional style of writing an essay: Start with an introductory paragraph, a few paragraphs that form the body of the essay and a concluding paragraph. You are free to adopt any style that you wish, to address the given Issue. A template for your response to an Issue task is shown here.



### Tips

Be sure to address all the key aspects presented in an Issue.

### Introductory Paragraph

- Announce your position.
- Define key word(s), if needed.

### Body

- Build 3–4 paragraphs around the points you made a note of, ensuring that several perspectives are considered.
- Develop each point fully, duly supporting it with reasons and/or examples.

### Conclusion

- Emphatically restate your position.
- Close well with an effective concluding remark.

## 4. Edit & Proof Read

### At this Stage, Check

- General understandability.
- Whether your opinion is clear and not self-contradictory.
- Coherence within a paragraph.
- Whether the right kind of transitional words are used while moving from one paragraph to the other.
- Grammar, spellings, and logic.
- Whether there is adequate variety in the sentences formed.
- The effectiveness of the introductory and the concluding paragraphs.

### Implication of the 4 Steps for the Argument Task

To respond to the Argument task effectively, you need to understand how arguments are constructed, how they are evaluated, (by considering the conclusion), how the evidence and the underlying assumptions are constructed. You need not use complex Latin terms mentioned in books on logic and reasoning. Do not burden yourself with too many technicalities that probably clutter your mind rather than clarify.

You must spot any reference made to:

- Explanations indicating causal (cause and effect) relationships.
- Generalizations made on the basis of one or two examples, unrelated analogies, and clumsy evidence related to the past, which may not be relevant to the present or future.
- Statistical terms such as sample, numbers, percentages, and trends. Check whether these terms are used correctly to represent the entire population.

An understanding of the basic terms like argument, conclusion, evidence, assumption, alternative explanation or a counter example is needed to successfully handle argument essays.

Remember that your response to the argument must be based on the specific instructions that follow the argument topic.

### I. Read the Topic Very Carefully

- What is the conclusion?
- What is the evidence presented?
- What is/are the underlying assumption(s)?

A word of caution: Do not start thinking about your opinion, the way you normally would when tackling an Issue task. You have to evaluate the soundness of the logic presented in the argument. Assume that the information presented is true even though it may be contrary to generally accepted facts.



#### Tips

Build a sound argument and convince the reader with the rationale you present.



#### Tips

Support your position with compelling reasons and examples.



#### Tips

In an Argument task, you critique somebody else's argument by examining the rationale presented.



#### Tips

Decide whether the given evidence and the unstated assumption(s) actually lead to the conclusion.



## 2. Plan the Response

- Does the evidence presented actually lead to the stated conclusion?
- Is the author making any assumption? If yes, is the assumption valid?
  - What are the flaws in the reasoning presented?
  - What logic or example can be given to counter the argument?



### Tips

Be aware that you are expected to come up with your own ideas. Therefore, do not use any statement from anyone else's work.

## 3. Type the Response

- An important task is to summarize why the given argument cannot be accepted.
- State your opinion and reason out why you are convinced about your opinion.
- State your suggestions to improve the argument.
- Point out what the author has failed to utilize to make the argument plausible.
- Attack the claim by referring to the fact that the argument has obvious flaws or is merely plausible but not completely fool-proof.



### Tips

Be sure to address all the key aspects presented in an Issue.

## Introductory Paragraph

- Restate the information in your own words.
- Announce that the argument is flawed.

## Body

- Discuss the flaws in the line of reasoning by providing counter reasons/examples by bringing in hypothetical situations, if necessary.
- Critique causal relationships presented, such as analogies, generalizations, and statistics.
- Use transitional phrases: Firstly, Secondly,.....

## Conclusion

- Summarize your points
- Discuss how the argument can be improved
- Suggest ways of strengthening the conclusion



### Tips

Decide whether the argument is making an assumption. Identify the flaws in the underlying assumptions made in the argument.

- State the repercussion of the conclusion and/or extra evidence that is needed for better evaluation of the claim.

#### 4. Edit & Proof Read

##### At this Stage, Check

- General understandability of your opinion.
- Whether your opinion is clear and not self-contradictory.
- Whether a paragraph is coherent.
- Whether the right kind of transitional words were used when starting a new paragraph.
- Grammar, spellings, and logic.
- Whether there is adequate variety in the sentences.
- Whether the introductory and concluding paragraphs are effective.



##### Tips

Think of different situations where the viewpoint is valid.



##### Tips

While proof reading and editing, try to detach yourself emotionally from your writing. Imagine that you are reviewing somebody else's work.

### Sample Responses

#### Response to Issue Task-score 6

##### Sample Issue Topic

**'Discipline is a dangerous concept as it induces fear, which in turn stifles creativity.'**

*Discuss the extent to which you agree or disagree with the above statement and support your position with valid reasons and examples.*

Discipline is the practice of training people to obey rules or a code of behavior, hence is important to achieve success in life. Does it stifle creativity? Before we answer this query we need to be sure of one thing. Does discipline induce fear or is it the other way. It could be both ways. Discipline born out of fear is dangerous. It does not allow freedom of thought. But fear born out of discipline can bring about positive effects like obedience.

History is a witness to the fact that any creative work which went against the tenets of the church was considered evil and was punished. In fact, people were scared to disobey the church. They obeyed the rules of the church out of fear that they may be punished. Their creativity suffered. Those who were not scared but went ahead to discover or invent things but not in accordance with the church were persecuted. Discipline of this nature produces fear stifling creativity.

A soldier is taught absolute discipline and any deviation of orders results in severe punishment. Here is a case of fear born out of discipline. He willingly submits to this nature of duty as he understands that lack of discipline can cause unprecedented problems. To succeed in sports a sports man should be disciplined and fear induced in such cases can never be detrimental to his success.



##### Tips

Evaluate the complexities of the issue within the framework of the specific instructions.



##### Tips

There is no right or wrong answer in an Issue or an Argument Task.

In the name of discipline if we are not given freedom to think independently and denied the right to be innovative. We cannot refute that fear induced in this manner chokes creativity. However, fear born out of discipline is acceptable as it leaves a positive result and helps in creating new avenues. So it is difficult to take the stand that discipline kills ingenuity.

## ***Response to Issue Task-score 5***



### **Tips**

Read carefully the instructions that follow an Issue task.

A creative task involves the use of imagination or original ideas in order to create something innovative. Can this be done in an environment of fear? Fear creates an unpleasant emotion because there is a chance of danger, pain or harm. If discipline induces fear then it acts like an iron hand curbing new ideas. It prevents out of the box thinking. Fear inculcates blind obedience.

Some may be of the opinion that a leader who is authoritarian can bring better results in an organization. He knows his job and can get work done because he is a disciplinarian. His subordinates are scared of him. However, this kind of iron hand control will kill the enthusiasm and many a worker is too wary of doing things differently. This is unlikely to create a healthy work atmosphere. Workers work under stress and fail to enjoy what they are doing. Their contribution is mechanical without any personal involvement. In the long run it is harmful to the progress of the company.



### **Tips**

Address the complete issue keeping in mind the instructions that follow the Issue.

How often we hear from students that they are doing a particular course because their parents want them to do. They are scared of doing something in a different way or thinking of something from a different angle. Parents do not allow them to think differently. It is a closed mind set. Out of the box thinking is almost a taboo. Can we be sure that students who fall into such narrow minded thinking can ever be creative?

Obey, but not blindly. Blind obedience, because of discipline induced fear can be a stalemate. One should learn to react to the demands of the situation. A soldier who follows strictly the orders of his superiors may sometimes fall into this kind of a trap. He may fail badly because he decides only to follow rules lest he should be punished and therefore does not react to the situation.

Discipline from any angle seems to be curtailing creative thinking because it is fear inducing. Creativity is therefore hampered under stressful conditions.

## ***Response to Issue Task-score 4***

### ***Discipline is not Always a Dangerous Idea to Have***



### **Tips**

Ensure that the evaluator understands your opinion.

Discipline is the act of enforcing rules and regulations. It can be self imposed or forced upon us by others. Human beings in most of the cases tend to break the rules when they are forcefully subjected on them. Discipline is no exception. Take the case of a student, when he is forced to do something he doesn't like, he tends to be mechanical rather than doing it whole heartedly.

For us not to break the rules, there must be a strong force wither to oppose it, or a fear of the implications when we cross over. Self discipline can have the strong will opposing the break, but fear can only take its place when the rules are imposed externally. Even the opposite can be true in some cases, fear can instill discipline. Fear of failure, fear of being ridiculed can help us be organized.

A person with self discipline has more chances of being successful. Fear on the other hand can also increase the creativity in some cases. We tend to be at our aggressive best when we have our backs against the wall. Given a stringent task and a very strict timeline, there can be instances when a person with the fear of failure tends to be creative. But more often than not, it stops our mind from focusing on the task at hand and we succumb to the pressure and try to be as machinistic as possible, only trying to find a way out. Solution becomes important than the approach.

Too much of discipline can also be dangerous. As there is a limit to everything. Over stretching ourselves can lead to breakdown, there can be another Hitler or a China in the making.

I would say, self discipline is a good thing to have forcefully imposing rules and instilling fear in the minds is definitely a hinder to creativity in most cases.

### Response to Issue Task-score 3

*'Discipline is a dangerous concept as it induces fear, which inturn stifles creativity.'*

Discipline is an act of sticking to a set of rules and follow them strictly. These rules could either be set by an outside agency or could have been created by ourselves.

The term discipline is certainly not a dangerous concept but is inefficient in certain circumstances. If a person chooses to be very discipline in his daily routine of life, his ideas gets stuck up and he would not be flexible enough to adopt the changes in life.

Fear factor is an important part of discipline as it sometime results as an outcome of it. Although, this helps in generating new ideas in our minds to avoid failure. Hence, fear of failure or achieving the goal can also force us to act in a disciplinary way which seldom results in being innovative.

I would here like to mention a real example of my own life on this issue. Economics was the most challenging subject for me while I was studying in +2 level. It was my weakest topic and I has a fear of loosing the. This lead me to spend more time on this subject and get more disciplined with this. My regular method of doing book-reading for this subject did not work and I thought an idea of creating a topic-wise chart solely for this subject. This helped me to become the highest scorer in Economics at national level and I was awarded merit for it.

Therefore, I concluded that discipline is effective in majority of the times but it doesn't stifles creativity always due to its fear factor involve in other cases, it makes us become rigid in certain situations.

### Response to Issue Task-score 2

Discipline is the act of abiding to a set of pre-defined rules, adopted to achieve success. I partially agree with the idea of discipline inducing fear and thereby hampering creativity.

I recall from my days of adolescence that I, naively imagined my school teacher as a gatekeeper to hell since I was made to believe that she would hand



#### Tips

While editing, put yourself in the evaluator's shoes.



#### Tips

Budget your time well. Ensure that you finish your task in the allotted 30 minutes.



#### Tips

Display coherence in the paragraphs by sticking to the golden rule of 'one idea per paragraph'.

me out to the devil if I did not memorise the historical events chronologically by heart. The result was history always seemed to me as a subject, I has to get through and never realized the interesting hidden learnings that it had to offer.

Imagine if Galileo had not been chivalrous enough in defying the traditional beliefs enforced by the monaurally them and not discovered that the earth is special we still would have been living on a flat earth. Consider the case of the mighty dictator Aloy Hitler. During his reign, he was greatly successful in mainstating germans to a good state after world war-I. But looking at the darker side, germans war forced to believe that jaws should be ostracized and have no reason to be kept alive when they were as human as the germans themselves.

History is witness looking at the upside about discipline, to a variety of eminent leaders, scientists, technologists who have reached the pinnacle of innovations - thanks to the level of discipline that was inculcated in them during their childhood though enforced through fear itself.

In sumaration, like the two blades of the same scissor, the adoption of discipline is indeed a stepping stone to reach the summit, but extremely of which can be jeapordising. The trick lies in the degree of intensity and fear risen in order to enforce it. It's a common practice to rise fear as a tool to inculcate discipline. With the right mix of both, discipline can be risen to create the right open, liberating and growth conducive recipie for life.

## ***Response to Issue Task-score 1***

Discipline is a dangerous concept as it induces fear, which inturn stifles creativity.

Discipline is a powerful fool and necessary in many cases. However, the manner in which it is induced into one's mind makes a total difference. Totally forced discipline can lead to fear and inturn spoil one's creativity and progress.

I would categorize discipline into two: external discipline and inner discipline. External discipline is forced rules, it is not possible to manage a large set of people and provide uniform services. For example, If every student of a school is allowed to come at his/her convenient time, conducting classes and importing

knowledge uniformly is not possible.

### ***Sample Argument Topic***

Write a response in which you examine the stated and /or unstated assumptions of the argument. Be sure to explain how the argument depends on these assumptions and what the implications are if the assumptions prove unwarranted.

### ***An Article from a Magazine about Pets***



#### **Tips**

Use variety in words and sentences to make the essay lively.



#### **Tips**

Use active voice wherever possible. Ensure that each sentence has a clear subject.

'Dog lovers rejoice! Research has proved that owning a dog actually helps keep you healthy. Recently, two different groups—one that owned dogs and the other that did not—were studied. Researchers examined the condition of the heart of 100 dog owners and 100 others who did not own a dog. It was noticed that dog owners typically had a far healthier heart. Therefore, if you want to lead a healthy and long life just get a dog.'

## Response to Argument Task-score 6

You want to have a healthy heart and a long life: Just go get a dog. Is it that simple? If it were it would offer easy solutions to many of our health problems. A news paper reported that a study conducted on 100 dog owners showed that they had a healthier heart than those who did not own dogs. What does a healthy heart signify? Does it confirm over all good health? If health means a general condition of the body or mind with reference to soundness and good vigor, we surely cannot support the argument of the author. Owning or loving a dog therefore, is not an automatic gate way to a healthy and long life.

My neighbor underwent an open heart surgery a month ago. Incidentally he has three dogs. Being the owner of three dogs obviously was not enough to prevent the onset of a heart disease. A dog is a good companion. Time spent in your dog's company is rewarding. But to draw a conclusion that to remain healthy all that one needs to do is own a dog is a farfetched notion.

'People who own dogs have a healthier heart' confirmed a research conducted recently. What can be inferred from this? We can infer that if one wants a healthy heart one needs a dog. So if you don't have a dog, buy one. We need to understand that a healthy heart and owning a dog are not aspects which have one to one co-relation. More over a heart that is in good condition does not necessarily confirm overall wellbeing. A person may suffer from some other chronic ailments.

It is a good idea to own a dog if it means it is compulsory morning and evening walk for me along with my dog. Physical exercise is a bonus offered to all dog owners only if they walk their dogs themselves. It is not very often that dogs are taken out by their owners for a walk. So all dog owners are not necessarily getting that promised incentive of owning one.

Validity of any research finding mostly depends on the sample size adopted. Under any yard stick a sample of hundred cannot really represent a large group as there are other parameters that need to be considered before drawing conclusions. Research of such nature has limited scope and It is therefore not appropriate to suggest that owning a dog can certainly give one a sound heart. Owning a dog may show that you have large heart but not always a healthy heart.

## Response to Argument Task-score 5

Dogs help people to keep them healthy. Can we believe it? According to a reserch dog owners proved to have far healthier heart than others. But I personally feel health depends on several aspects but not merely on possession of dog. And the implications of research are not accurate.

The first assumption which casts doubt on research finding is that not all the dog owners do exercise along with dogs which they own. They may delegate this work to their servants in which case privillage of good health is enjoyed by the one who does jogging along with dog. It clearly shows that possession of dog wouldn't do any miracle but it is the exercise that you do regularly along with dog helps people to keep healthy.

Another assumption which contradicts with the findings of research is that several people lead healthy, longer life even though they don't own a dog. One needs not to have a dog to exercise which inturn leads to good health and longevity. People who are health consciousness need not to have a dog as a reminder to their health regime.



### Tips

Practice using the correct transitional words to help the reader move from one point to the other.



### Tips

Remember that the word processor used in the test is an elementary one with no facility of spell check or grammar check. You can only insert, cut, copy, paste and delete.



### Tips

Become familiar with the keyboard and improve your typing speed.

Finally, there is a reasonable possibility of people being allergic to dogs. Some people develop symptoms like rashes, runny nose, mild fever and many more. These symptoms may hamper their regular exercise regime which in turn leads to unhealthier. So it should not be considered that owning a dog leads to healthiness and longevity. Which depend on several other factors including proper diet and exercise.

### ***Response to Argument Task-score 4***

The problem with the argument is the assumption that to lead a healthy life one should get a pet.

This is not true always. Firstly, we should understand that dogs, if owned, need to be taken care of properly by the owners. So only an active and healthy individual who can devote time for a dog can go for one. This undermines the claim that owning a dog helps one stay healthier. Further the argument does not hold water as it does not mention how a dog helps one to stay healthy.



#### **Tips**

Be familiar with terms like argument, conclusion, evidence, counter argument and counter examples.

The author refers to a study conducted and it appears to have exaggerated the figures because by just getting a dog one cannot stay healthy. There may be many other factors like a regular exercise and diet which have actually helped them in remaining healthy. It could be that it was coincidental that those who had a healthy heart also owned dogs. And as said in the argument if it is true that owning a dog keeps one healthy, then more than half the world's population should be ailing. But this is not the case.

Moreover, owning a dog is a financial responsibility as dogs, like humans, need healthy and nutritious diet and quality dog-food is expensive. Thus, only a certain class can afford to own a dog. Then, does it mean that those who cannot afford to own a dog, for whatever reasons, cannot lead a healthy life?

Further, according to the argument research has proved that owning a dog helps one stay healthy.

But there might have been other reasons which have also been considered by the research team and those have not been included by the author like, the individual's active lifestyle. Even if one owns a pet one may choose to lead a sedentary life by entrusting its responsibility to a paid trainer. Then, we cannot say that owing a dog is a sure-fire solution for leading a healthy life.

### ***Response to Argument Task-score 3***

The argument that dog owners have a long and healthy life is faulty.

First of all, the argument assures that dog owners are the same as dog lovers and those who spend considerable time with their pets. It does not take into consideration whether the subjects are really lovers of their pets. Other members in their family could be more associated with the pets than the owners themselves are.

Granted that all dog owners are not dog lovers there may be other reasons for their good health such as moderate diet and exercise.



#### **Tips**

Give your judgment about the logical soundness of the given argument within the parameters prescribed by the directions that follow.

The argument mentions that only 100 people from each group were studied. The member is too small to arrive at a definite conclusion. Also the age, sex and other factors such as lifestyles are not considered for selection of the subjects.

The argument points out that dog owners had a healthier heart therefore dogs promote long and healthy life. This conclusion is also faulty because it assumes that healthier heart is equal to a healthy body. It overlooks the fact that people may suffer from health problems not necessarily associated with heart.



The argument should include the other parameters of the subjects such as age, sex and lifestyles and also ascertain that the subjects actually spend considerable time with their pets. Then the argument could be giving fruitful results about the research.

## ***Response to Argument Task-score 2***

A healthy dog is needed first of all to keep a heart healthy. Only then the owner of the dog can take it out and exercise so that he can have a healthy heart. To have the dog to be healthy we need to feed it well. May be meat. This is going to be costly. If we don't feed meat may be the dog will not live for long. More over to avoid rabies we must vaccinate the dog. this will also be add to the cost. I feel if the dog dies the owner will have a broken heart. This will cause stress and weaken his heart.

Therefore we cannot strongly agree that a dog will give all of us a healthy heart. Sometimes may be but not always. So we cannot be sure about owning a healthy heart because we have a dog. To have a healthy heart we need to take good vitamins also.

All dogs owned by vegetarians may not be healthy because they do not eat meat. If they do not eat meat how can they feed the dog meet. So only non-vegetarians can have good hearts from their dogs.

But non-vegetarians will face the problem of cost. Meat is too costly. all cannot buy. So no surety can be given that dog owners will have a healthy heart. Dogs once used to eat meat will not eat any thing. Not bread also. By the way giving dog milk is also costly.

I have a friend who got admitted in the hospital after his dog died. Do you know why? because he was so sad. He got stress. Poor fellow he loved his dog so much. There are many like him. Who will have a broken heart because dogs died. In view of all this a dog cannot promise a healthy heart.



### **Tips**

Do not present your own opinion about the subject matter of an argument.

## ***Response to Argument Task-score 1***

News paper said that dogs will give healthy hearts. In fact 100 people said. Not too many but they did say. Can we all buy dogs? Buying dogs is some what good because it will protect our house also. Will it give a healthy heart? That depends on the owner. That is what the paper says.

Dog owners have healthy heart. But that sounds too waek. How can we say dogs give healthy hearts. Many people die inspite of owning a dog.

We cannot totally agree that dog owning can give all of us good heart. But one thing I can tell it will love us and guard us. The other day my neighbours dog saved their house from being robbed.

Owner of the dog must take the dog for a walk daily. Only then his heart will become strong. The paper says 100 dog owners claimed that they have a healthy heart. Not a big sample.

Sometimes dogs bark continually. This is dangerous for heart patients. I mean the noise. Then how can we say dogs give healthy heart.

We should not agree that dogs give healthy hearts because they do not do so always. We should not believe what the papers say. We must see with our own heart and eyes. So don't believe what they say and accept.



### **Tips**

To the extent possible, use active voice. This means using a verb to convey the right action taken by the subject of your sentences.



## Scoring Guide

### Scoring Guide for an Issue and Argument Task

#### Response-score 6

- At this level of response, the task given is convincingly tackled, relevantly correlated, and smartly conveyed.
  - There is clarity in the response.
  - Response is supported by gripping and convincing examples.
  - There is synchronization of ideas and logical flow of thought.
  - Succinct use of words results in clear ideas.
  - Although not absolutely error free, the response meets the rules of standard English.



#### Tips

Place the subject and verb at the beginning of a sentence.

#### Response-score 5



#### Tips

Master the rules pertaining to the use of comma, semicolon, colon, the dash, and the period (full stop).

- At this level of response, the task given is well organized and the evaluation is well tackled.
- Succeeds in clearly presenting the stand taken on the given task.
- Relevant material is used and logically convincing ideas are developed.
- Attention is given to arranging relevant ideas sequentially.
- Appropriate use of words and sentences is noticed.
- Although the given task is tackled well there may be a few grammatical errors.

#### Response-score 4

- At this level of response, the task given is tackled with adequate lucidity.
- Stand taken is supported with sufficient details.
- Good examples are provided to elucidate the position taken.
- Ideas presented exhibit clarity.
- There is adequate language fluency.
- The number of errors is higher at this level of response.

#### Response-score 3



#### Tips

Add power to your writing by using the active voice.

- At this level of response, clarity and relevancy in ideas are missing.
- There is no focus on the given issue.
- Supporting ideas are either missing or inadequate.
- Ideas presented are incomprehensible.
- Contains grammatically incorrect sentences.
- Redundancy and wrong diction is noticed.

**Response-score 2**

- The response at this level shows lack of comprehension and interpretation.
- There is absolute failure in tackling the issue at hand.
- No relevant support material is utilized.
- The task is badly organized and presented without logic and coherence.
- Faulty diction and grammar and inappropriate vocabulary is noticed.
- Structurally inadequate.
- Errors are more in number.

**Tips**

The simple present or past tense is the most precise form of writing and is easy for a reader to understand.

**Response-score 1**

- The response at this level proves to be faulty on many accounts.
- Lack of understanding of the given task.
- Badly organized ideas.
- Language is faulty.
- Sentence construction is faulty.
- Glaring misrepresentation of facts.

# CHAPTER 4

## Vocabulary Builder

### ***Vocabulary Builder***

#### ***Basic Strategies for Vocabulary Building***



#### **Tips**

Read extensively: The more words you're exposed to, the better is your vocabulary.

Building one's vocabulary is both an art and a science. The art lies in being able to create meaningful connections in the mind and the science lies in knowing certain logical ways of learning words.

The science of vocabulary building involves understanding:

- Meanings of words in particular contexts.
- What part(s) of speech (POS) a word may take.
- The constituent, roots, prefixes and suffixes (RPS) hidden in a word.
- Positive, negative and neutral characteristics of words.
- Words that have multiple meanings.
- The grouping of related words.

You may come across the term, Mnemonics, in a few books. This term refers to any method that can assist in improving the memory. All the methods discussed above help you to retain words and hence demonstrate mnemonics in its applied form.

The exercises that follow are based on the above-mentioned techniques that can help you to build a strong foundation for your vocabulary.

#### ***Vocabulary Builder Drill 1***

In this exercise, five key words have been used in different sentences. These key words have been highlighted by using bold italics. Based on the given context, derive the meaning of the highlighted words:

1. We left after the storm had ***abated***.
2. Amelia's ***aberrant*** behavior surprised all her friends.

3. The management decided to keep the plan in **abeyance** till the revenues increased substantially.
4. The accused in the case is **absconding** and no one seems to have a clue where he could have gone to.
5. The entire team **abstained** from voting.

### Explanation to Vocabulary Builder Drill 1

1. We left after the storm had **abated**.

Careful reading of a sentence can help you to deduce the meaning of words which are not a part of your vocabulary.

For example, in this sentence 'We left after the storm had **abated**', it is obvious that people must have left after the storm decreased in its intensity. *Abate* means exactly that: **to decrease in intensity**.

The key word to focus on is 'left'. We use plain deductive logic to arrive at the meaning of unknown words. This ability is particularly useful in the new GRE® which tests your vocabulary and logical ability.

2. Amelia's **aberrant** behavior surprised all her friends.

If Amelia's behavior surprised all her friends then she must have behaved in an odd manner; it must have not been her normal way of behaving. Here, the key word to focus on is 'surprised'. *Aberrant* means deviant not normal.

3. The management decided to keep the plan in **abeyance** till the revenues increased substantially.

Here, the key expression to focus on is 'till the revenues increased.' This expression indicates that the management must have postponed its plan and must decide whether or not to pursue the plan till the revenues increased. *Abeyance* refers to a state of adjournment or postponement.

4. The accused in the case is **absconding** and no one seems to have a clue where he could have gone to.

From the tone of the sentence, it is clear that the accused must have left without informing anyone about his whereabouts. To *abscond* means to **depart secretly**.

5. The entire team **abstained** from voting.

It is obvious that either the team has cast its vote or has not cast its vote. A little bit of knowledge in grammar can help you to make the correct interpretation. The preposition *from* is used when a person is prohibited *from* doing an activity; whereas, we say, 'A person has indulged *in* an activity.' Hence, we can infer that the team kept away from or **abstained** from voting.



#### Tips

Try and figure out the meanings from the context. A majority of words are learnt through context.

### Vocabulary Builder Drill 2

Given below is a set of five words. Write (a) in front of the words you are sure of, (b) in front of the words you seem to be vaguely aware of, and (c) in front of the words you do not know at all:

1. Amoral.
2. Apathy.
3. Anarchy.
4. Anomalous.
5. Anachronism.

### Explanation to Vocabulary Builder Drill 2



#### Tips

The root is the primary unit of a word. It forms the base of more complex words.

A good grasp of prefixes, roots, and suffixes helps derive the meaning of a word, even if it is not in a context.

1. Amoral.
2. Apathy.
3. Anarchy.
4. Anomalous.
5. Anachronism.

The prefixes **a/an/ana** mean *not or without*.

1. An **amoral** person is one who does **not** have moral values.
2. **Apathy** means **not** having pathos or emotions. The root *pathos* means *feelings*. Hence, a person who is apathetic to somebody's **plight** is insensitive to the other person's problems.
3. The root *arch* means *rule*. **Anarchy**, therefore, means a state of no rule or *lawlessness*.
4. The word **anomalous** can be split into three parts: *an* means *not*, *nomal* means *similar*, and *ous*, a suffix used to form an adjective. Hence, words that end in *ous* are invariably adjectives.
5. **Anachronism** can be split into three parts: *an*, which means *not*, *chron* is a root that means *time*, and *ism* is a Greek suffix used to form nouns. It indicates a state or condition. **Anachronism** therefore refers to something or someone that *does not belong to a particular time*. For example, cell phones belong to the modern era but historical characters used in cell phones will be an example for anachronism.

### Vocabulary Builder Drill 3

You now have some idea of roots, prefixes, and suffixes. Now test your ability to apply this concept on the cluster of words given below.

**Chain 1:** Archaic...monarch...archeology.

**Chain 2:** Sympathy...empathy...antipathy...pathetic...pathos.

**Chain 3:** Malevolent...malediction...malign...malignant.

**Chain 4:** Chronicle...chronic...synchronize...chronometer.

**Chain 5:** Aneroid...prologue...epilogue...dialogue.

### Explanation to Vocabulary Builder Drill 3



#### Tips

A root word is the most basic form of a word that is able to convey a particular description, thought, or meaning.

**Chain 1:** Archaic...monarch...archeology.

The common thread running through the above words is *arch* that means *rule*. A related form *archeos* means *old*.

Anything archaic is outdated. The suffix *-ic* indicates an adjective.

A monarch is a sole ruler. *Mono* means one.

Archeology is the scientific study of the past of human race based on analysis of remains of pottery and other remains of a particular culture. Remains are obviously old. The suffix *-ology* or *-logy* refers to a subject or branch of science.

**Chain 2:** Sympathy...empathy...antipathy...pathetic...pathos.

The root *pathos* means feelings.

*Sympathy* refers to the kind of feelings that a person has for another person. The prefix *sym-* means together or same. Words ending with the suffix *-y* are nouns.

In *empathy*, the prefix *em-* means *in* and the word *empathy*, therefore, should be used, when a person identifies completely with the thoughts of another person.

The prefix *anti-* means against and thus *antipathy* is hatred.

*Pathetic* is an adjective and means evoking feelings of sadness.

*Pathos* is a noun that broadly means sympathy.

**Chain 3:** malevolent...malediction...malign...malignant.

The prefix *mal-* is the common thread in all these words and it means *bad*.

In *malevolent* the root *-vol-* refers to intentions and *-ent* denotes an adjective. Hence, a *malevolent* person is one whose intentions are bad.

A *malediction* is a curse. The root *-dict-* means speech. Words ending in the suffix *-tion* are nouns.

To *malign* means to speak ill of someone and it is a verb. The adjective *malignant* is used to refer to something that is very harmful.

**Chain 4:** Chronicle...chronic...synchronize...chronometer.

The root *chron* means *time* and a chronicle is a record. A chronic disease is one that has been there for some time. To *synchronize* means to make something happen at the same time. A *chronometer* is a device that can be used to measure time. The suffix *-meter* means *measure*.



#### Tips

A root word can be expanded using prefixes and suffixes.

**Chain 5:** Prologue...epilogue...dialogue.

The root 'log' refers to speech.

A *prologue* is the preface or introductory remarks of an author, while an *epilogue* is the concluding remark. Here *pro-* is a variant of *pre-* which means *before* and *epi-* refers to *after or outer*. A *dialogue* is a conversation between two or more people. *Dia-* means *across*.

### Vocabulary Builder Drill 4

We associate words with positive, negative or neutral feelings. Decide what kind of feeling do you associate with each of the five words given below. In case a particular word seems new to you, just guess.

S.No.	Word	Positive	Negative	Neutral
1.	Benefit			
2.	Cacophony			
3.	Defunct			
4.	Equanimity			
5.	Eulogy			

### Explanation to Vocabulary Builder Drill 4

1. *Benefit* has a positive connotation. *Bene/bon* mean *good*.
2. The root *phon* means *sound* and *cacophony* is *bad sound*.
3. The prefix *de-* means *away or down* and *defunct* means *no longer functional*.

4. The prefix *equa-* means *equal* and the root *anim* means *mind or spirit*. *Equanimity* refers to the ability to remain *unaffected by circumstances*.
5. *Eulogy* is *high praise*. The prefix *eu* means *good*.

**Tips**

It's important to recognize parts of speech. This helps one to analyze and understand sentences. It also helps to construct good sentences.

**Vocabulary Builder Drill 5**

Identify the part of speech for the words given below: Mention two other related parts of speech for these words. Restrict yourself to Verbs, Nouns and Adjectives.

S.No.	Word	POS	Related POS (1)	Related POS (2)
1.	Abstain			
2.	Compliant			
3.	Defer			
4.	Impairment			
5.	Laud			

**Explanation to Vocabulary Builder Drill 5**

S.No.	Word	POS	Related POS (1)	Related POS (2)
1.	abstain	verb	abstemious (adj)	abstinence (noun)
2.	compliant	adjective	comply (verb)	compliance (noun)
3.	defer	verb	deferred (adj)	deferment (noun)
4.	impairment	noun	impair (verb)	impaired (adj)
5.	laud	verb	laudable/laudatory (adj)	applause (noun)

**Vocabulary Builder Drill 6****Tips**

To identify the part of speech of a word, one should know the meaning, position, and use of the word in a sentence.

In each of the questions below, a small phrase with a word underlined is given. The phrase is followed by a few words. You have to figure out how many of the given words can act as a substitute word for the underlined word.

- (A) Passion for artistic pursuits.  
Mission, bent, penchant, amiability, cacophony, proclivity, predilection, cameo, affinity.
- (B) Inexplicable hatred for technology.  
Aversion, benediction, ardor, autonomy, loathing, antipathy, repugnance, revulsion, prevarication, grandiloquence.
- (C) His generous and helpful nature.  
Philanthropic, belittling, befuddling, acute, altruistic, parsimonious, benevolent, bountiful, condescending, hyperactive.

- (D) A calm and undisturbed environment or person.  
Foreboding, tranquil, listless, halcyon, placid, garrulous, decadent, unruffled, composed
- (E) The first person or even a supporter or practitioner of a cause.  
Advocate, forerunner, autocrat, precursor, champion, egocentric, patron, proponent, protagonist, thespian.

### ***Explanation to Vocabulary Builder Drill 6***

- (A) Passion for artistic pursuits.  
Bent for artistic pursuits.  
Penchant for artistic pursuits.  
Proclivity for artistic pursuits.  
Predilection for artistic pursuits.  
Affinity for artistic pursuits.
- (B) Inexplicable hatred for technology.  
Inexplicable aversion for technology.  
Inexplicable loathing for technology.  
Inexplicable antipathy for technology.  
Inexplicable repugnance for technology.  
Inexplicable revulsion for technology.
- (C) His generous and helpful nature.  
His philanthropic nature.  
His altruistic nature.  
His benevolent nature.  
His bountiful nature.
- (D) A calm and undisturbed environment or person.  
A tranquil environment or person.  
A halcyon environment or person.  
A placid environment or person.  
An unruffled environment or person.  
A composed environment or person.
- (E) The first person or even a supporter or practitioner of a cause.  
Advocate of a cause.  
Forerunner of a cause.  
Precursor of a cause.  
Champion of a cause.  
Patron of a cause.  
Proponent of a cause.  
Protagonist of a cause.



#### **Tips**

Every single word belongs to one of the eight groups of parts of speech: Nouns, pronouns, verbs, adjectives, adverbs, prepositions, conjunctions, and interjections.



# CHAPTER 5

## Sentence Equivalence

### **Introduction**

#### ***What the Questions Look Like***

Each question comprises a sentence with one word or phrase left out. The sentence is followed by six answer choices. You are expected to choose two answer choices one at a time which fits the blank perfectly within the context of the sentence. The two sentences thus formed using the two answer choices must have the same meaning.

If you get one of the answers right and the other wrong, you will not get any credit.

A word of CAUTION: Out of the six choices given, there may be other pair(s) of synonyms that DO NOT fit in the given context.

#### ***What do Sentence Equivalence questions Test?***

##### **These Questions Test the Ability to:**



##### **Tips**

In Sentence Equivalence questions, you have to choose a pair of synonyms, which when fitted in the blank, result in two sentences that have equivalent (same) meaning.

- Recognize the logical structure of a sentence.
- Spot cue words.
- Use the information in the context to complete a sentence.

Based on the information provided in the sentence, you need to understand the meaning of the sentence. You must also keep in mind that the sentence usually has enough clues to guide you to the right word that fits the given blank. While answering these questions, do not use information which is not within the context of the sentence. These questions primarily test the ability to understand the

logic inherent in a given sentence. To be really good at answering sentence equivalence questions, you must also be good at advanced vocabulary.

In a nut shell, these questions test your ability to:

- (a) Spot the underlying logic
- (b) Notice the contextual clues

**Sample Question**

Q. Though the \_\_\_\_\_ of qualitative research consider it a superior method as the analyst plays an active role while eliciting a subject's responses, its detractors feel that such excessive involvement could result in a biased analysis, thereby making the research undependable.

- |                |                |
|----------------|----------------|
| (A) Critics    | (D) Scholars   |
| (B) Incumbents | (E) Proponents |
| (C) Advocates  | (F) Mediators  |

Answer: C and E

**The Manhattan Review strategy to answer Sentence Equivalence questions**

**Step 1:** Read the complete sentence carefully, to understand:

- The theme or subject of the sentence.
- The clue words that indicate the comment about the subject.
- The structural elements used by the author while constructing the sentence.
- The tone of the author as revealed by the words used.

**Step 2:** Paraphrase the sentence in a manner that is easier for you to understand.

**Step 3:** Predict a word for the blank before looking at the choices.

**Step 4:** Examine the choices to check whether any option has the word you predicted or a synonym of it.

**Step 5:** Fit the chosen word into the sentence and read the complete sentence to check that the sentence has acquired a logically and stylistically satisfying meaning.

**Step 6:** You have to choose two options, so identify a second word, that fits the sentence logically. The entire sentence should convey the same meaning as the one conveyed when you fit in the previous word in step 5.

**Tips**

Some words may look correct. Check whether they logically fit in the sentence before choosing them as the correct answers.

**The Manhattan Review Strategy Applied on the Sample Question**

Let us do a thorough analysis of the sample question and understand the application of the *Manhattan Review Strategy* in answering Sentence Equivalence questions.

**Sample Question**

Q. Though the \_\_\_\_\_ of qualitative research consider it a superior method as the analyst plays an active role while eliciting a subject's responses, its detractors feel that such excessive involvement could result in a biased analysis, thereby making the research undependable.

- |                |                |
|----------------|----------------|
| (A) Critics    | (D) Scholars   |
| (B) Incumbents | (E) Proponents |
| (C) Advocates  | (F) Mediators  |

### Let Us Quickly Recap the First Step

**Step 1:** Read the complete sentence carefully to understand the:



#### Tips

Pay attention to the structure of the sentence. This will guide you to the right answer.

- Theme or subject of the sentence.
- Structural clues used in the construction of the sentence.
- Clue words that indicate the comment about the subject.
- Style/tone adopted by the author as revealed by the clue words.
- The theme or subject of the sentence: **It is a comment about qualitative research.**
- The structural elements used in the construction of the sentence: **Though.**
- The clue words that indicate the comment about the subject: ...consider it a superior method; ...its detractors feel... result in biased analysis.
- The style/tone of the author: Though... consider it a superior method ... its detractors feel ... could result in biased analysis....
- The sentence is used in a comparative style. It is analysing and comparing facts in an objective manner. It states that the supporters of qualitative research consider it a superior method as the analyst plays an active role while eliciting a subject's responses. On the other hand, the detractors or critics feel that the involvement of the research itself brings in bias in the analysis, thereby making the research undependable. This is not an opinion but an observation and the sentence adopts 'a matter of fact tone'. The sentence does not allow any intrusion. In other words, the sentence is not used in a subjective tone.



#### Tips

Plug your answer word into the sentence and re-read to check whether the sentence is logically and grammatically correct.

**Step 2:** Paraphrase the sentence in a manner that is easier to understand.

The skeleton of the sentence looks like this: Though group A considers it (qualitative research) a superior method... group B (the detractors) feel that such research (is) undependable.

**Step 3:** Predict a word for the blank after reading the complete sentence but before looking at the choices.

From the overall analysis, we can predict that an appropriate word for the first blank is 'supporters'.

**Step 4:** Examine the choices to check whether any option has a word similar to the word enclosed in quotation marks. You will notice that option C is 'advocates', which broadly means 'supporters'.

**Step 5:** Besides this, option E, 'proponents' is synonymous to 'supporters'.

Hence, the answers are C and E.

### A Note on Structural Clues

'Though the \_\_\_\_\_ of qualitative research consider it a superior method as the analyst plays an active role while eliciting a subject's responses, its detractors feel that such excessive involvement could result in a biased analysis, thereby making the research undependable.'

Here the word 'though' should trigger a thought in a smart reader: You should understand that the sentence will present a contrast. The word 'though' is a structural clue; it is a word that indicates a contrast. Besides the word 'though', the other commonly used contrast indicators are 'besides this', 'however', 'nevertheless', 'nonetheless', 'although', 'but', 'despite', 'whereas', and 'on the other hand'.

Likewise, there are some words or phrases that indicate a continuation: ‘and’, ‘moreover’, ‘further’, ‘furthermore’, ‘in addition’, etc. You may choose to compare like or unlike things by using words such as ‘just as’, ‘similarly’, ‘like’, ‘just like’, and ‘in the same way’. To prove a point, authors may use concrete evidence and then arrive at a conclusion based on the evidence. We must understand, when a sentence is making use of evidence and when it is drawing conclusions. Words and phrases such as ‘since’, ‘because’, ‘as’, ‘as a result of which’, ‘therefore’, ‘thus’, ‘in conclusion’, and ‘consequently’ indicate that the sentence is drawing a conclusion or showing evidence.

Besides continuing, contrasting, comparing, showing evidence and concluding, a sentence may use other words like ‘first and foremost’, ‘thereafter’, ‘subsequently’, ‘then’, ‘finally’, ‘to sum up’, and ‘in other words’ for various reasons such as showing a time sequence, as well as summarizing and paraphrasing what has already been stated.

To summarize, it is important that you know the rules of standard, formal, written English including idioms, phrases, and collocations. This will help you comprehend better, the clues provided by sentences.

**Tips**

Sentence equivalence questions test your ability to recognize the logical structure of a sentence.

### ***A Note on Contextual Clues***

The context is the background built into a sentence. In any sentence, there is an explicit or implicit subject, a verb, and a comment about the subject. Look at the example once again to understand better, the concept of contextual clues.

‘Though the \_\_\_\_\_ of qualitative research consider it a superior method as the analyst plays an active role while eliciting a subject’s responses, its detractors feel that such excessive involvement could result in a biased analysis, thereby making the research undependable.’

What is the subject of the sentence? Qualitative research.

What is the subject compared to? The opinion of two groups of people, (1) one group which considers qualitative research a superior method and (2) the other group which considers it undependable.

What is the reason given by the group which considers qualitative research a superior method? The analyst plays an active role while eliciting a subject’s responses.

What is the reason given by the group which considers qualitative research undependable? Such involvement itself brings in bias in the analysis.

A careful reading of the second part of the sentence will give you an idea that an antonym of the word will fit the blank correctly.

**Tips**

Sentence equivalence questions test your ability to use cue words and contextual information to complete a sentence logically.

### ***The Complete Analysis***

When you read a sentence carefully, you simultaneously understand the subject, the comment, the structural clues, the contextual clues, and the tone/mood of the author. These are not individual, isolated, or sequential steps.

To understand how a good reader will analyze the entire sentence, let us now break down this sentence. The comments in parentheses indicate the way an effective reader could be thinking.

‘Though

(Oh! There is a contrast in this sentence.)

The \_\_\_\_\_ of qualitative research.

(Here is the subject of the sentence.)

Consider it a superior method.

(What does the subject do?)

(The subject considers it a superior method.)

(It stands for... qualitative research.)

As.

(This word indicates a reason)

The analyst plays an active role while eliciting a subject's responses.

(This is the reason why the subject considers it a superior method. OK...that means these guys are supporters of qualitative research).

Its detractors feel that such involvement itself brings in bias in the analysis.

(It means that a positive word should fit the blank. The word 'detractors' and the contrast indicator 'Though' are good enough clues).

Feel that such involvement itself brings in bias in the analysis, (OK...this is the reason why the detractors do not like qualitative research as a methodology).



### Tips

In order to determine which word would fit the blank, you must initially predict, based on the information given.

Thereby (...this is a word that indicates a consequence).

Making the research undependable. (This is an after effect of bias. This is what happens when bias sets in... 'the research becomes undependable.')

(A word which means supporters should fit the blank.

A few broad synonyms for 'supporters' are champions, protagonists, defenders, enthusiasts, advocates, backers, expounders, proponents,...).

'Advocates' is option C and 'proponents' is option E.

Plug the word 'advocates' into the sentence and read it completely to check whether the word fits well into the sentence.

'Though the advocates of qualitative research consider it a superior method as the analyst plays an active role while eliciting a subject's responses, its detractors feel that such involvement itself brings in bias in the analysis, thereby making the research undependable.'

The word fits perfectly and the inherent logic is retained.

Let's plug in the other word 'proponents' into the sentence and read it completely to check whether the word fits well into the sentence.

'Though the proponents of qualitative research consider it a superior method as the analyst plays an active role while eliciting a subject's responses, its detractors feel that such involvement itself brings in bias in the analysis, thereby making the research undependable.'

This word sounds perfect too.

In a nutshell, we can break the sentence down, analyze one part at a time and use logic to understand how the sentence is constructed.

'Though' indicates a contrasting view point.

The proponents of qualitative research consider it a superior method...(Why?) as the analyst plays an active role.

While eliciting a subject's responses, (You can even substitute the word 'while' with 'when' and rephrase this part of the sentence and say,... 'the analyst plays an active role when eliciting a subject's responses'.) The comma after 'responses' indicates a minor pause.

Ensure that you pause at a comma. Then the correct meaning of the sentence will surface.



### Tips

Use the words that are provided in the sentence to predict what sort of word would fit the blank.

Its detractors feel (feel what?)

That such involvement itself brings in bias in the analysis, (pause at the comma to understand the sentences thoroughly. The following is the reason for their unhappiness about the method.).

Thereby making the research undependable. The comma after ‘thereby’ indicates a minor pause. You can even substitute the word ‘thereby’ with ‘consequently’ or ‘resultantly’. And now rephrase this part of the sentence and say... consequently making the research undependable.

This is how we can break the sentence down and comprehend the complete meaning!



### Tips

Use cue words such as ‘and’, ‘but’, ‘though’, ‘or’ and ‘because’ to help you narrow the choices.

## PRACTICE EXERCISES

**Directions:** Choose two options which, when used separately in the sentence, produce complete sentences that mean the same.

### Exercise No. 1

- The paintings depict the \_\_\_\_\_ moods of nature: from its most benevolent to its savage best.
 

(A) Irate	(D) Unpredictable
(B) Vexatious	(E) Innumerable
(C) Myriad	(F) Pallid
- Children learn at varying rates; some are abysmally slow while others demonstrate exceptional \_\_\_\_\_.
 

(A) Fearlessness	(D) Immaturity
(B) Confidence	(E) Irregularity
(C) Celerity	(F) Expedition
- Though the origin of billiards is lost in history, an account by a famous Greek traveler suggests that a \_\_\_\_\_ version was first played by the Egyptians around 400 BC.
 

(A) Frivolous	(D) Casual
(B) Embryonic	(E) Medieval
(C) Rudimentary	(F) Revised
- Though Caroline’s confidence was severely dented when she fared poorly on the test, her teachers, however, \_\_\_\_\_ her to take the test again as they were confident she would do well if she gave herself adequate preparation time.
 

(A) Cajoled	(D) Mollified
(B) Exhorted	(E) Goaded
(C) Rattled	(F) Pilloried
- In this remote island, the teenaged prince is suitably cocooned from the political uncertainties that \_\_\_\_\_ his homeland.
 

(A) Dog	(D) Desecrate
(B) Protect	(E) Demean
(C) Plague	(F) Negate
- To avoid being dehydrated during summer workouts, which can be quite \_\_\_\_\_, one must intermittently sip mineral water to replenish the essential salts lost.
 

(A) Irritating	(D) Sultry
(B) Demanding	(E) Humid
(C) Lethal	(F) Enervating

☞ Pallid = pale, wan.

☞ Vexatious = annoying, irritating.

☞ Pilloried = ridicule, deride

☞ Desecrate = defile, violate, dishonor.

7. Critics consider an athlete a legend only if he/she performs consistently well in the international arena as they are \_\_\_\_\_ to extend credit for flash-in-the-pan performances.
- (A) Sympathetic (D) Disinclined  
(B) Prejudiced (E) Reluctant  
(C) Lambasted (F) Obligated
8. Physiotherapy and medicine were beneficial, but more than that, the \_\_\_\_\_ climate of the unpolluted hills seemed to have had an effect on the patient's health.
- (A) Convivial (D) Overwhelming  
(B) Captivating (E) Salutory  
(C) Imminent (F) Salubrious
9. Though its operations are still at the incipient stage, surprisingly, the startup firm has announced not only high salaries but also perquisites, such as low interest car loans and luxurious flats, and has consequently become the \_\_\_\_\_ employer among job seekers.
- (A) Most genuine (D) Paragon for  
(B) Most sought after (E) Laughing stock of  
(C) Most coveted (F) Benchmark for
10. None would disagree that she was breathtakingly beautiful but her \_\_\_\_\_ did not go down well with her suitors.
- (A) Elegance (D) Hauteur  
(B) Charm (E) Superciliousness  
(C) Reticence (F) Masculinity

☞ Imminent = about to happen.

☞ Reticence = unwillingness to speak.

## Exercise No. 2

**Directions:** Choose two options which, when used separately in the sentence, produce complete sentences that mean the same.

1. The authorities have \_\_\_\_\_ fresh concerns by their recent pronouncements that the city will be hit by shortage of water and power.
- (A) Coined (D) Triggered  
(B) Sparked (E) Mitigated  
(C) Qualified (F) Refuted
2. The \_\_\_\_\_ rise of women to seats of power and scholarship, even in predominantly patriarchal societies, has astonished even the most ardent optimists.
- (A) Bucolic (D) Spectacular  
(B) Meteoric (E) Grandiloquent  
(C) Fervent (F) Meticulous
3. The indomitable spirit of Alexandra Tesluk spurs commoners to break the shackles of their \_\_\_\_\_ circumstances and seek a better tomorrow.
- (A) Perennial (D) Restrictive  
(B) Salubrious (E) Unwarranted  
(C) Torpid (F) Prohibitive
4. Her anger is palpable as she has been a victim of brute force in a country ruled by a military junta and, yet she decries violence; her kindness is inspirational and represents a silver lining in an otherwise \_\_\_\_\_ society.
- (A) Whimsical (D) Emulative  
(B) Diffused (E) Blighted  
(C) Bleak (F) Indigent

☞ Torpid = mentally or physically inactive.

☞ Grandiloquent = pompous, showy.

☞ Savior = good Samaritan, conservator, defender.

☞ Whimsical = fanciful.

5. Rotterdam is a city to \_\_\_\_\_: the skyline dotted by breathtaking neon signs and gigantic bridges that saddle a river flowing through the heart of the city.
- (A) Bolster (D) Occlude  
(B) Embellish (E) Behold  
(C) Foment (F) Descry
6. Some words originate from extreme \_\_\_\_\_, get influenced by alien cultures, and get so metamorphosed that it becomes impossible to correlate them with their roots.
- (A) Archaism (D) Antiquity  
(B) Ingenuity (E) Piety  
(C) Complexity (F) Speciousness
7. Gestures, by and large, mean the same across several related cultures, differing occasionally, and when this happens the contrariety could be very \_\_\_\_\_, to the uncultured but surprising to the uninitiated.
- (A) Unpredictable (D) Deferred  
(B) Trite (E) Pronounced  
(C) Intricate (F) Conspicuous
8. If you visit the beach at sunset, you may feel you are swimming in an ocean of breathtaking beauty—during the evening, the tides seem to have been \_\_\_\_\_ with gold.
- (A) Gilded (D) Resonant  
(B) Plummeted (E) Displayed  
(C) Bedecked (F) Cocooned
9. Several intellectuals berated the journalist for \_\_\_\_\_ the scientist's achievements and highlighting the strife in his personal life.
- (A) Redeeming (D) Broaching  
(B) Placating (E) Discounting  
(C) Overlooking (F) Rescinding
10. In politics and governance, it may not be a good idea to debate outmoded issues: what \_\_\_\_\_ does not register well in the public's mind.
- (A) Dulls imagination (D) Is banal  
(B) Lacks currency (E) Demeans authority  
(C) Is non-polemic (F) Is not in vogue

☞ Placate = appease, assuage.

☞ Polemic = a strong verbal or written attack.

☞ Trite = lacking originality.

### Exercise No. 3

**Directions:** Choose two options which, when used separately in the sentence, produce complete sentences that mean the same.

1. Catherine, apparently, is right in her analysis; to prove her point she gave a PowerPoint presentation, backed by \_\_\_\_\_ statistics and crystal clear logic that has now convinced the jury that its earlier stand was fallacious.
- (A) Doctored (D) Refreshing  
(B) Pedantic (E) Elaborate  
(C) Contentious (F) Novel
2. There is \_\_\_\_\_ in this composer's style—a style that has not been stultified by coaching, a raw beauty that is both divine and unique.
- (A) Erudition (D) Homogeneity  
(B) Naiveté (E) Spontaneity  
(C) Dissonance (F) Reverence

☞ Doctored = tampered, adjusted.

☞ Pedantic = didactic, doctrinaire.



3. Austerity may not always be a virtue as it may \_\_\_\_\_ an unwillingness to stretch oneself to attain at least bare minimal needs.
- (A) Thwart (D) Magnify  
(B) Engender (E) Mask  
(C) Camouflage (F) Exacerbate
4. The rich baroness was now confronted with a fear: whether her \_\_\_\_\_ son would be the right choice as an heir to her legacies; she could not bear the thought of her fortunes being used for wasteful pursuits.
- (A) Aggressive (D) Prodigal  
(B) Fastidious (E) Ambitious  
(C) Irreverent (F) Extravagant
5. The old often feel \_\_\_\_\_ in a society where youthfulness is idolized; with each passing day the morbid fear of being unwanted and not being in the mainstream creeps in.
- (A) Derided (D) Marginalized  
(B) Sidelined (E) Harangued  
(C) Discredited (F) Embarrassed
6. What may seem a colossal problem today, in due course of time, may even seem \_\_\_\_\_, making you wonder later, how you, in the past, could be occupied by something so absurd.
- (A) Insular (D) Farcical  
(B) Distant (E) Ludicrous  
(C) Indeterminate (F) Precipitate
7. Perhaps, one good that comes of visiting a retreat is the tranquility that makes us aware of the chaos in our mind, and consequently, we indulge in self-therapy, suggesting to ourselves to emerge from the \_\_\_\_\_ within us and be like the environment around us.
- (A) Sublime (D) Resolve  
(B) Discord (E) Inertia  
(C) Lethargy (F) Strife
8. The notion that sunspots cause periods of extreme cold on the Earth has now been caught in the \_\_\_\_\_ between the advocates who are convinced about their belief and the opponents who denigrate the idea.
- (A) Rigmarole (D) Crossfire  
(B) Fusillade (E) Intransigence  
(C) Dilemma (F) Acrimony
9. Historical biographies that can \_\_\_\_\_ the memories of a bygone era, particularly the ones pertaining to the lifestyle and the cultural ethos, do have a soothing effect on the minds of modern readers.
- (A) Encapsulate (D) Highlight  
(B) Corroborate (E) Elicit  
(C) Evoke (F) Amplify
10. Sadly enough, the Mayor's assurances \_\_\_\_\_: even a child can make out that he is paying lip sympathy to the victim's plight.
- (A) Are iconoclastic (D) Ring hollow  
(B) Sound insincere (E) Stultify  
(C) Insinuate (F) Are provocative

- ☞ Camouflage = disguise, cloak.
- ☞ Reverence = respect, veneration, deference.
- ☞ Farcical = absurd.
- ☞ Insinuate = make indirect allegations about someone.
- ☞ Stultify = make useless, absurd, or ineffectual.

### Exercise No. 4

**Directions:** Choose two options which, when used separately in the sentence, produce complete sentences that mean the same.

- |  |   |
|--|---|
| <p>1. Though Emily Bronte's literary works were not _____ her contemporaries, yet, in general, her works have received rave reviews from later generations and have had a profound impact on them.</p> <p>(A) Immutable to            (D) Revered by<br/>(B) Esteemed by            (E) Censured by<br/>(C) Reviled by            (F) Sacrosanct to</p> <p>2. The cult of violence represents a _____ order; the gains of centuries can be nullified in no time by mobs on the rampage.</p> <p>(A) Degrading            (D) Regressive<br/>(B) Distinct            (E) Misguided<br/>(C) Symbolic            (F) Bellicose</p> <p>3. A/An _____ strategy needs to be adopted for our energy management: A judicious usage of available fossil fuels coupled with a renewed search for alternative energy sources is the need of the hour.</p> <p>(A) Multi-faceted            (D) Bilateral<br/>(B) All-encompassing            (E) Two-fold<br/>(C) Double-pronged            (F) Distinctive</p> <p>4. The radio jockey's comments were a tad too _____, an unnecessary take on a man whose demeanor had always been beyond reproach; the result: A volley of protests that flustered the management to no end.</p> <p>(A) Partial            (D) Provocative<br/>(B) Dense            (E) Vexing<br/>(C) Obtuse            (F) Blabbering</p> | <p>5. Learning is a subconscious process of continuous _____ where words, ideas and images keep integrating with certain objectives.</p> <p>(A) Judgment            (D) Correlation<br/>(B) Cognition            (E) Appreciation<br/>(C) Understanding            (F) Association</p> <p>6. Modern-day enterprises are witnessing large-scale attrition; consequently, Human Resource managers have their task cut out: _____ what could go wrong and then design retention strategies that ensure that key manpower does not leave.</p> <p>(A) Relive            (D) Describe<br/>(B) Envisage            (E) Elaborate<br/>(C) Experience            (F) Visualize</p> <p>7. Francis Bacon's precepts are glistening nuggets of literary gems, embellished with aptness and _____, unlike the verbose and circumlocutory style of certain writers of his era.</p> <p>(A) Flair            (D) Brevity<br/>(B) Alliterations            (E) Insinuations<br/>(C) Calumny            (F) Concision</p> <p>8. Inept economic planning leads to recession that not only has a _____ effect on all governmental programming but also exerts immense pressure on the common man as prices of essential commodities skyrocket.</p> <p>(A) Reprehensible            (D) Counterbalancing<br/>(B) Significant            (E) Domino<br/>(C) Ripple            (F) Therapeutic</p> |
|--|---|

☞ Sacrosanct = untouchable, above suspicion.

☞ Bellicose = aggressive and ready to fight.

☞ Calumny = false accusation.

☞ Envisage = imagine, fancy.

☞ Inept = possessing insufficient ability.

9. The underdogs are elated at their one-off victory, but they must \_\_\_\_\_ the fact that the erstwhile champions, many times in the past, have shown the ability to bounce back from the jaws of defeat.
- (A) Account for (D) Consider  
 (B) Reckon with (E) Exaggerate  
 (C) Disseminate (F) Negate
10. Though as a civilization we seem to have descended to the nadir yet the irony is that nothing seems to knock us out of our \_\_\_\_\_.
- (A) Privacy (D) Smugness  
 (B) Cacophony (E) Malevolence  
 (C) Complacency (F) Conceit

☞ Cacophony = harsh mixture of sounds; ill-sounding.

### Exercise No. 5

**Directions:** Choose two options which, when used separately in the sentence, produce complete sentences that mean the same.

1. He faces the \_\_\_\_\_ highs and the demotivating lows of life with stoicism not normally associated with someone so young.
- (A) Abominable (D) Confounding  
 (B) Exhilarating (E) Invigorating  
 (C) Debilitating (F) Mesmerizing
2. The jury, which acquitted the deposed governor for lack of sufficient evidence, was \_\_\_\_\_ the media since many vital clues were overlooked during the trial.
- (A) Glossed over (D) Flayed by  
 (B) Enraged by (E) Flustered with  
 (C) Pilloried by (F) Encumbered by
3. In a society that was rabidly \_\_\_\_\_, audacious assaults against non-conformists were more of a rule than an exception.
- (A) Truculent (D) Chauvinistic  
 (B) Precarious (E) Compromising  
 (C) Jingoistic (F) Overbearing
4. The dull rustic youngster of yester-years had metamorphosed into an erudite and urbane scholar in less than a decade, \_\_\_\_\_ the fears that he would be the only one in his family without any academic distinction.
- (A) Countermanding (D) Rescinding  
 (B) Relegating (E) Assuaging  
 (C) Allaying (F) Consigning
5. In spite of his ill health, the aging professor braved inclement weather to arrive at the venue on time, and in his \_\_\_\_\_ style enthralled the audience with his educative and informative talk.
- (A) Rueful (D) Inimitable  
 (B) Equivocal (E) Precipitate  
 (C) Intricate (F) Nonpareil
6. The new manager displayed uncalled for \_\_\_\_\_ when he asked the senior directors to back their stand about the project's feasibility by getting the financial calculations duly endorsed by him.
- (A) Impertinence (D) Avarice  
 (B) Aggrandizement (E) Dissemblance  
 (C) Temerity (F) Forbearance

☞ Debilitate = weaken.

☞ Chauvinistic = excessive support; extreme patriotism.

7. She was \_\_\_\_\_; obviously being intimate with friends from dubious background had left its imprint on her demeanor.
- (A) Vindictive                      (D) Uncouth  
 (B) Diabolical                      (E) Boorish  
 (C) Elusive                          (F) Covetous
8. History is replete with accounts of how kings in their weakest moments have paid heed to malicious information provided by unscrupulous elements and then became \_\_\_\_\_ after realizing their folly.
- (A) Introspective                  (D) Contrite  
 (B) Remorseful                    (E) Knowledgeable  
 (C) Hapless                         (F) Hospitable
9. Substantial marine exports have \_\_\_\_\_ the erstwhile sleepy, nondescript coastal town onto the international arena.
- (A) Hurtled                          (D) Catapulted  
 (B) Vexed                            (E) Pervaded  
 (C) Underestimated              (F) Suppressed
10. The nouveau riche youngster was advised by well-meaning friends to curb his new-found enthusiasm for \_\_\_\_\_, lest his family slide back to the indigent life they were leading in the not so distant past.
- (A) Gregariousness              (D) Solicitousness  
 (B) Pretension                      (E) Ostentation  
 (C) Sentience                      (F) Attenuation

☞ Diabolical = heinous, vicious, wicked.

☞ Avarice = greed.

☞ Contrite = remorseful.

☞ Ostentation = flamboyant display of wealth.

☞ Gregarious = social, genial, outgoing.

# CHAPTER 6

## Text Completion

### ***Introduction***

#### ***What the Questions Look Like***

In questions on text completion, you will be given one to five sentences that form a single passage. You will notice one to three numbered blanks. Corresponding to each blank, there will be three options from which you are to choose a word that fits the blank. Note that in case of questions with only one blank, the number of options to choose from, will be five.



#### **Tips**

Skilled readers do not read text passively. They interpret and even guess what could come next.

To answer the questions, fill in the blank(s) by selecting one word from the corresponding choices, ensuring that the entire text is meaningfully complete.

You will not get any points for partially correct answers. For example, in a two-blank question, if you answer one blank correctly and the other incorrectly then it will be considered that you have answered the question incorrectly.

#### ***What Do Text Completion Questions Test?***

Text completion questions go a step beyond sentence equivalence questions. Text completion questions test your ability to understand the logical connection between sentences and how they form a paragraph reflecting a coherent idea, whereas sentence equivalence questions test your ability to understand words, parts of a sentence, and how these parts are interrelated.



#### **Tips**

Words and expressions such as 'but', 'yet', 'besides this', 'on the other hand', 'nonetheless', and 'however' indicate contrast.

**Sample Question**

In the past, children seldom have/had any say in family decisions, but now, one can come across a new breed of juveniles that has (1)\_\_\_\_\_ power as it knows that constant insistence will make parents surrender. While children in bygone days would at best use their pester power to buy a particular brand of chocolate, now they use the same power with (2)\_\_\_\_\_ to influence family purchase decisions related to even products such as computers, cars, televisions, and many other items. This may not be (3)\_\_\_\_\_ as today's younger generation is definitely better informed about new products.

**Tips**

A word can have several meanings; in text completion questions, a word with an uncommon meaning may be used.

**Blank (1)**

minimal  
considerable  
legitimate

**Blank (2)**

telling effect  
a large scale  
a moderate extent

**Blank (3)**

an altogether bad trend  
completely acceptable  
utterly demeaning

Before we go further, let us understand what a text is in this context. A text is a paragraph that explores a single idea. The central idea of the text may be developed by defining, explaining, critiquing, or comparing.

Every sentence is a part of a well-written paragraph which flows naturally into the next sentence. In other words, there will be some correlation, some commonality between two consecutive sentences.

**The Manhattan Review Strategy to Answer Text Completion Questions**

**Step 1:** Read the complete passage carefully and try to understand the gist of the passage.

**Step 2:** Read again and this time, pay particular attention to the structural and contextual clues. Try and understand the tone, attitude, and mood of the author.

**Step 3:** Predict a word for each blank after you have read the complete text but before you read the choices.

**Step 4:** Look at the choices to check whether any option has a word synonymous with the word you predicted.

**Step 5:** Read the sentence by filling in the blanks with the words you have chosen ensuring that the original meaning of the sentence has not changed.

**Tips**

For two and three blank questions, all your responses must be right otherwise you will not be awarded points for the question.

**The Manhattan Review Strategy Applied on the Sample Question**

In the past, children seldom have/had any say in family decisions, but now one can come across a new breed of juveniles that have (1)\_\_\_\_\_ power as they know that constant insistence will make parents surrender. While children in bygone days would at best use their pester power to buy a particular brand of chocolate, now they use the same power with (2)\_\_\_\_\_ to influence family purchase decisions related to even products such as computers, cars, televisions, and many other items. This may not be (3)\_\_\_\_\_ as today's younger generation is definitely better informed about new products.

**Tips**

A text completion question may have one sentence with only one blank. In such questions, the number of options will be only five.

**Blank (1)**

minimal  
considerable  
legitimate

**Blank (2)**

with telling effect  
on a large scale  
to a moderate extent

**Blank (3)**

an altogether bad trend  
completely acceptable  
utterly demeaning

**Tips**

Notice words that indicate a continuation or a contrast. Decide whether a positive, negative or neutral word suits a particular blank.

**Step 1:** Read the complete passage carefully and try to understand the gist of the passage.

We understand that the behavior of children of a previous generation is compared to the behavior of children of the present day. We can make out that the children of yester years were milder and that the children of the present generation are very assertive.

If we observe, we can also notice that the author compares the behavior in the first two sentences and then in the last sentence compliments ‘today’s younger generation’.

**Step 2:** Read again and this time, pay particular attention to the structural and contextual clues. Try and understand the tone, attitude, and mood of the author.

**Tips**

In your initial reading, try to grasp the overall gist of the text. Do not be in a hurry to fill in the blanks as you read.

The key words in the first sentence are:

**Sentence 1:** In the past... but now (comparison).

**Sentence 2:** While ...in bygone days..., now(comparison).

**Sentence 1:** Children ...family decisions (subject or theme of the text).

**Sentence 2:** ... at best use their pester power to buy a particular brand of chocolate... to influence ... even products such as computers, cars, and televisions. (Extends the idea presented in the first sentence).

**Sentence 1:** New breed of juveniles (tone indicator).

**Sentence 2:** Pester power (tone indicator).

**Sentence 3:** Definitely better informed (In this part, the author says something positive about present-day children).

**Step 3:** Predict a word for each blank after you have read the complete text but before you read the choices.

**Step 4:** Look at the choices to check whether any option has a word synonymous with the word you predicted.

**Step 5:** Read the sentence by filling in the blanks with the words you have chosen ensuring that the original meaning of the sentence has not changed.

With so many clues in the passage, we are in a position to predict words for the blanks. To begin with, let us look at Sentence 1.

**Sentence 1:** In the past, children seldom have had any say in family decisions, but now one can come across a new breed of juveniles that has (1) \_\_\_\_\_ power as it knows that constant insistence will make parents surrender.

We can infer that when it came to purchase-related decisions, children of the earlier generation rarely had the power to influence their parents...but now... they are exercising quite a lot of power. This idea is best brought out by the word ‘considerable’.

**Sentence 2:** While children in bygone days would at best use their pester power to buy a particular brand of chocolate, now they use the same power with (2)\_\_\_\_\_ to influence family purchase decisions related to even products such as computers, cars and televisions.

Since we know that nowadays children are very effective in using pester power, we can conclude that the expression 'telling effect' will fit the second blank.

**Sentence 3:** This may not be (3)\_\_\_\_\_ as today's younger generation is definitely better informed about new products.

If a person is informed better, it may not be a bad idea to allow him/her to take decisions about new products.

The expression 'an altogether bad trend' fits the third blank.

**Step 5:** Read the sentence by filling in the blanks with the words you have chosen ensuring that the original meaning of the sentence has not changed.

In the past, children seldom have had any say in family decisions, but now, one can come across a new breed of juveniles that has considerable power as it knows that constant insistence will make parents surrender. While children in bygone days would at best use their pester power to buy a particular brand of chocolate, now they use the same power with telling effect to influence family purchase decisions related to even products such as computers, cars, and televisions. This may not be an altogether bad trend as today's younger generation is definitely better informed about new products.

**Tips**

For two and three blank questions, it is not necessary that you start filling in the blanks as you read. Start from the blank that you are confident of answering correctly.

**Tips**

Words and expressions such as 'and', 'further', 'moreover', and 'in addition to' indicate a continuation.

## PRACTICE EXERCISES

### Exercise No. 1

**Directions:** Choose words from the options that logically fit the blanks.

- |  |                           |                  |                  |               |                     |           |                       |                           |             |                 |                      |                 |  |                  |                  |                  |                 |                  |                  |                  |              |                  |                 |                 |                |
|--|---------------------------|------------------|------------------|---------------|---------------------|-----------|-----------------------|---------------------------|-------------|-----------------|----------------------|-----------------|--|------------------|------------------|------------------|-----------------|------------------|------------------|------------------|--------------|------------------|-----------------|-----------------|----------------|
| <p>1. Cynics assert that (1)_____ may be the hallmark of divinity. According to them, all (2)_____ have inherent prejudices and self-interests. Consequently, our judgments get (3)_____ as the subjective element is always bound to creep in.</p> <table border="0" style="width: 100%;"> <tr> <td style="text-align: center;"><b>Blank (1)</b></td> <td style="text-align: center;"><b>Blank (2)</b></td> <td style="text-align: center;"><b>Blank (3)</b></td> </tr> <tr> <td>(A) Mysticism</td> <td>(D) Decision makers</td> <td>(G) Jaded</td> </tr> <tr> <td>(B) Disinterestedness</td> <td>(E) Renowned philosophers</td> <td>(H) Colored</td> </tr> <tr> <td>(C) Forgiveness</td> <td>(F) Ordinary mortals</td> <td>(I) Superficial</td> </tr> </table> | <b>Blank (1)</b>          | <b>Blank (2)</b> | <b>Blank (3)</b> | (A) Mysticism | (D) Decision makers | (G) Jaded | (B) Disinterestedness | (E) Renowned philosophers | (H) Colored | (C) Forgiveness | (F) Ordinary mortals | (I) Superficial | <p>2. The road between the two grounds serves as some sort of (1)_____: If you look to the left, you can see a sprawling lawn where a family is hosting a lavish luncheon for friends; (2)_____ can be felt in the air. On the right, at a distance, you can spot a leper couple with a stray dog for company. (3)_____ seems to have embraced all these emaciated creatures; happiness perhaps never touched their lives.</p> <table border="0" style="width: 100%;"> <tr> <td style="text-align: center;"><b>Blank (1)</b></td> <td style="text-align: center;"><b>Blank (2)</b></td> <td style="text-align: center;"><b>Blank (3)</b></td> </tr> <tr> <td>(A) Ambivalence</td> <td>(D) Parochialism</td> <td>(G) Exasperation</td> </tr> <tr> <td>(B) Vintage spot</td> <td>(E) Bonhomie</td> <td>(H) Intemperance</td> </tr> <tr> <td>(C) Demarcation</td> <td>(F) Destitution</td> <td>(I) Melancholy</td> </tr> </table> | <b>Blank (1)</b> | <b>Blank (2)</b> | <b>Blank (3)</b> | (A) Ambivalence | (D) Parochialism | (G) Exasperation | (B) Vintage spot | (E) Bonhomie | (H) Intemperance | (C) Demarcation | (F) Destitution | (I) Melancholy |
| <b>Blank (1)</b>   | <b>Blank (2)</b>          | <b>Blank (3)</b> |                  |               |                     |           |                       |                           |             |                 |                      |                 |  |                  |                  |                  |                 |                  |                  |                  |              |                  |                 |                 |                |
| (A) Mysticism  | (D) Decision makers       | (G) Jaded        |                  |               |                     |           |                       |                           |             |                 |                      |                 |  |                  |                  |                  |                 |                  |                  |                  |              |                  |                 |                 |                |
| (B) Disinterestedness  | (E) Renowned philosophers | (H) Colored      |                  |               |                     |           |                       |                           |             |                 |                      |                 |  |                  |                  |                  |                 |                  |                  |                  |              |                  |                 |                 |                |
| (C) Forgiveness  | (F) Ordinary mortals      | (I) Superficial  |                  |               |                     |           |                       |                           |             |                 |                      |                 |  |                  |                  |                  |                 |                  |                  |                  |              |                  |                 |                 |                |
| <b>Blank (1)</b>   | <b>Blank (2)</b>          | <b>Blank (3)</b> |                  |               |                     |           |                       |                           |             |                 |                      |                 |  |                  |                  |                  |                 |                  |                  |                  |              |                  |                 |                 |                |
| (A) Ambivalence  | (D) Parochialism          | (G) Exasperation |                  |               |                     |           |                       |                           |             |                 |                      |                 |  |                  |                  |                  |                 |                  |                  |                  |              |                  |                 |                 |                |
| (B) Vintage spot   | (E) Bonhomie              | (H) Intemperance |                  |               |                     |           |                       |                           |             |                 |                      |                 |  |                  |                  |                  |                 |                  |                  |                  |              |                  |                 |                 |                |
| (C) Demarcation  | (F) Destitution           | (I) Melancholy   |                  |               |                     |           |                       |                           |             |                 |                      |                 |  |                  |                  |                  |                 |                  |                  |                  |              |                  |                 |                 |                |

☞ Parochialism = excessive narrowness of interests or views.

☞ Melancholy = sadness, loneliness.



3. Pacifists advocate that peace is the key to human welfare and development. They consider (1) \_\_\_\_\_ to be the best solution for any kind of conflict as they believe that in all mortals there is inherent goodness and divinity.

**Blank (1)**

- (A) Arbitration (D) Rejuvenation  
(B) Patience (E) Empathy  
(C) Submission

4. Training is not a new concept; human beings in the pre-civilization era too (1) \_\_\_\_\_ the hunting skills of their offspring. Civilizations, thereafter, imparted organized training in the art of warfare to able-bodied youngsters to defend their group or plunder a rival's possessions. Later, in the era of industrialization, (2) \_\_\_\_\_ training became part and parcel of manufacturing with supervisors helping new recruits to understand the operations of machines; now we have management institutes that (3) \_\_\_\_\_ technical skills with managerial skills.

**Blank (1)      Blank (2)      Blank (3)**

- (A) Initiated (D) Mandatory (G) Peruse  
(B) Admired (E) Formal (H) Co-ordinate  
(C) Honed (F) Painstaking (I) Supplement

5. Most institutes now adopt the (1) \_\_\_\_\_ approach to curricular development wherein a few subjects are taught in a single block over one semester. It is almost (2) \_\_\_\_\_ to state that discussion of related subjects reinforces learning. Painstaking preparation, diligent revision, logical sequencing of concepts and problems graded in an ascending order can help in (3) \_\_\_\_\_ learning.

- Blank (1)      Blank (2)      Blank (3)**  
(A) Sequential (D) Paradoxical (G) Natural  
(B) Modular (E) Atypical (H) Optimal  
(C) Comprehensive (F) Axiomatic (I) Factual

6. Small budget films can turn out to be as good as, and (1) \_\_\_\_\_, big budget films. What they lose out on in terms of gloss, they could make up for in terms of (2) \_\_\_\_\_. The vividness of films can be an asset in education and especially since the education sector will always have to work on (3) \_\_\_\_\_, the answer could lie in high utility, small budget films that can be used by teachers as effective aids in the classroom.

- Blank (1)      Blank (2)      Blank (3)**  
(A) Be analogous to (D) Picturization (G) Ethical parameters  
(B) Remain economical than (E) Relevance (H) Shoestring budgets  
(C) Sometimes better than (F) Graphics (I) The semester pattern

7. For a magazine that dedicates itself to the cause of objective reporting on current issues like stem cell research and nanotechnology, treading the fine line between passionate touting and (1) \_\_\_\_\_ is not going to be easy. The young editors wish that readers view them as knowledgeable, responsible, and principled guides who will neither (2) \_\_\_\_\_ nor (3) \_\_\_\_\_ about these two areas of inquiry.

- Blank (1)      Blank (2)      Blank (3)**  
(A) Absolute insouciance (D) Be prejudiced (G) Become hypercritical  
(B) Vitriolic criticism (E) Toe the line (H) Be sycophantic  
(C) Utter degradation (F) Advocate uncritical embrace

☞ Hone = sharpen, fine tune a skill.

☞ Paradox = puzzle, anomaly, riddle.

☞ Vitriolic = bitter, rancorous.

☞ Insouciance = aloofness, coldness, coolness, detachment.

8. Patients suffering from chronic fatigue syndrome complain of debilitating weakness that does not allow them to perform even (1)\_\_\_\_\_. The problem in prescribing a medical treatment is that physicians are seldom able to (2)\_\_\_\_\_. Avoiding strenuous activities or somewhat prolonged rest also does not seem to help the afflicted, making some physicians (3)\_\_\_\_\_ that neuropsychological factors could be the reason; hence, cognitive behavior therapy, which equips patients with better coping methods, maybe the answer.

**Blank (1)**      **Blank (2)**      **Blank (3)**

- (A) Routine chores      (D) Gauge the side-effects      (G) Assert  
 (B) Sedentary jobs      (E) Pinpoint an organic cause      (H) Hypothesize  
 (C) Temporal tasks      (F) Continue the treatment      (I) Quip

9. His performance in the previous semester was nothing to (1)\_\_\_\_\_. Acting upon his mentor's suggestion, Elton decided to (2)\_\_\_\_\_, write elaborate notes and pay heed to the minor details too in order to get good grades in the current semester. This was in sharp contrast to the big-picture approach, giving

☞ Intransigent = stubborn, adamant, recalcitrant.

(3)\_\_\_\_\_ to the minutiae, that he had cultivated earlier.

**Blank (1)**      **Blank (2)**      **Blank (3)**

- (A) Be apprehensive about      (D) Be skeptical      (G) Scant respect  
 (B) Write home about      (E) Work assiduously      (H) Due attention  
 (C) Be pensive about      (F) Refer various manuscripts      (I) Inordinate time

10. The (1)\_\_\_\_\_ of youth rubbed on to the reticent faculty team. The festivities at the farewell party, the foot-tapping music played by the band, and the (2)\_\_\_\_\_ the administrative staff was enough to light up the spirits of even the (3)\_\_\_\_\_ of them, to let their hair down for once.

**Blank (1)**      **Blank (2)**      **Blank (3)**

- (A) Intransigence      (D) Constant egging by      (G) Sternest  
 (B) Cacophony      (E) Managerial skills of      (H) Boisterous  
 (C) Exuberance      (F) Din created by      (I) Pedantic

## Exercise No. 2

**Directions:** Choose words from the options that logically fit the blanks.

1. Whistleblowers, people who report wrongdoings inside an organization or group to internal or external authorities, confront (1)\_\_\_\_\_. Their allegations, at the least, may lead to strained or severed relationships with the accused coworkers or managers; in certain instances, however, they may have to (2)\_\_\_\_\_ from their organization or may even be penalized by law enforcers, if the accusations (3)\_\_\_\_\_.

**Blank (1)**      **Blank (2)**      **Blank (3)**

- (A) Unpopular paragon      (D) Reluctantly quit      (G) Remain unguided  
 (B) Mixed reactions      (E) Face severe reprisals      (H) Are pursued  
 (C) Stark reality      (F) Eventually demand      (I) Remain unsubstantiated

2. In medical malpractice suits, in order to get a claim, the plaintiff must first and foremost prove that the defendant is duty-bound to provide a service. Next, it has to be established that the service provider did (1)\_\_\_\_\_ prescribed or expected standards of care; such a/an (2)\_\_\_\_\_ has to be corroborated by expert testimony or must be very obvious. Thereafter, it has to be established that such negligence was (3)\_\_\_\_\_ the cause of the injury, physiological or psychological, for which the aggrieved party has filed a claim.

Blank (1)	Blank (2)	Blank (3)
(A) Manipulate	(D) Diligent adherence	(G) Increasingly
(B) Not conform to	(E) Breach of duty	(H) Resolutely
(C) Concoct or fabricate	(F) Inviolable decree	(I) Indubitably

3. In private litigation, an employer can be (1)\_\_\_\_\_ for the acts performed by employees during the discharge of their duties. Such (2)\_\_\_\_\_ founded on the assumption that the superior has power over the actions of the subordinates. In other words, it is presumed that the superior has the duty to control (3)\_\_\_\_\_.

Blank (1)	Blank (2)	Blank (3)
(A) Inadvertently appreciated	(D) Misconceptions are	(G) All litigants
(B) Surely redeemed	(E) Vicarious liability is	(H) The raconteur
(C) Held responsible	(F) Objective criteria is	(I) Every transgression

4. The Uruguay round hoped to expand the range of issues that came under the purview of the 'General Agreement on Trade and Tariffs' (GATT), bringing in matters pertaining to agriculture, textile, services, capital and intellectual property rights under (1)\_\_\_\_\_. This round turned out to be the (2)\_\_\_\_\_ trade agreement related to agricultural produce. In all earlier trade negotiations, agriculture was accorded a special status, but in Uruguay certain member countries refused to sign new deals unless this (3)\_\_\_\_\_ was addressed and suitably rectified.

Blank (1)	Blank (2)	Blank (3)
(A) Its fold	(D) Most far-reaching	(G) Glaring exception
(B) The aegis	(E) Globally acclaimed	(H) Hitherto ignored issue
(C) The scanner	(F) Unduly favored	(I) Ambivalence in talks

5. Ensuring that people pay attention to their advertisements has become a (1)\_\_\_\_\_ for marketers. This is because individuals normally tend to recall only a (2)\_\_\_\_\_ part of the information that they are exposed to. This automatically means that companies have to design advertisements that are exceptionally (3)\_\_\_\_\_. Once an advertisement catches the attention of a prospective customer, the product stands a chance of being noticed.

Blank (1)	Blank (2)	Blank (3)
(A) Blatant compulsion	(D) Subliminal	(G) Outlandish
(B) Challenging task	(E) Miniscule	(H) Arresting
(C) Desperate need	(F) Grotesque	(I) Flamboyant

☞ Inviolable = incorruptible, unassailable, secure.

☞ Vicarious = second-hand, substitute, felt on behalf of someone.

☞ Ambivalence = dichotomy, contradictory feelings.

☞ Aegis = patronage, auspices, shelter.

6. It was when the 1968 baseball season was to begin that Martin Luther King Jr. was gunned down, causing riots all over America and Fergie Jenkins the famous baseball player of Canada, who was the only black selected to play in the big leagues, became the franchise of civil rights movement on the field in Chicago. He recently celebrated his 68th birthday and felt honored when he heard that the Canadian government was going to issue a/an (1) \_\_\_\_\_ postage stamp in his name to begin 'Black History Month'.

**Blank (1)**

- (A) Commemorative (D) Oleaginous  
 (B) Commendable (E) Ceremonial  
 (C) Imperial

7. In the industrialized nations, life expectancy has increased to an average of about 80 years and that sounds like good news. Consequently, man's long-cherished dream of (1) \_\_\_\_\_ seems to be coming true. Yet, the luxury of a prolonged stay on this planet is a burden that most governments may not be able to bear in the long run. The cost of caring for the older citizens is sure to be high and ideas about how to (2) \_\_\_\_\_ it seem to be few. Add to it, the reality of lower birth rates in certain countries, and you have a set of (3) \_\_\_\_\_ that are very different and far more complex from what was the case in the 1960s or 70s, when death arrived much sooner and there were far more youngsters.

**Blank (1)      Blank (2)      Blank (3)**

- (A) Longevity (D) Finance (G) Alternatives  
 (B) Immortality (E) Sideline (H) Demographic patterns  
 (C) Omnipotence (F) Avert (I) Progeny

8. From an (1) \_\_\_\_\_ and largely unstated, though implicitly understood statement of a man's last wish, industrial societies have evolved highly formal systems of wills, bequeathals, and inheritances. Where once the distribution of a legacy among the extended family after the demise of the head of the family required almost no outside (2) \_\_\_\_\_, today we witness loads of paperwork, hordes of lawyers, and other complexities associated with death; ironically, social evolution has not refined our lives, especially when we consider the aspect of law and jurisprudence. (3) \_\_\_\_\_ authorities have confounded rather than clarified what once was more of a routine family matter.

**Blank (1)      Blank (2)      Blank (3)**

- (A) Unstructured (D) Interference (G) Lax and circumspect  
 (B) Ignoble (E) Intervention (H) Extra-familial  
 (C) Explicit (F) Interregnum (I) Autocratic

9. Several social thinkers have not felt comfortable with the repercussions faced by a society that has (1) \_\_\_\_\_ of a market economy. For them, products like life insurance are symbolic of (2) \_\_\_\_\_ of a society, as the policies sold in the name of economic protection, try to assign a monetary value to the sacredness of life itself. Self-help groups, neighbors, family and friends protected a widow and her wards earlier. Now this protection can be purchased and in the bargain filial and other societal bindings have been (3) \_\_\_\_\_.

**Blank (1)      Blank (2)      Blank (3)**

- (A) Been oblivious to the utility (D) Crass commercialization (G) Breached irreparably  
 (B) Embraced the tenets (E) Regular desecration (H) Rescinded completely  
 (C) Been absolutely devoid (F) Unparalleled development (I) Reinitiated partially

☞ Oleaginous = oily or greasy.

☞ Progeny = offspring.

☞ Interregnum = breach, break, breather.

☞ Oblivious = not aware of what is happening around.

10. A lay person may automatically associate off shore business with (1)\_\_\_\_\_. However, doing business beyond national barriers is not a joy ride. First and foremost, international business requires keen analysis of three different political angles: Foreign, domestic, and international. The first refers to the reactions of the host country, which may range from being friendly and accommodating to being suspicious and hostile. A clear-cut, adverse reaction from the host government (2)\_\_\_\_\_ is far better for a firm than being restricted from (3)\_\_\_\_\_ after getting an initial warm welcome at the time of offer

of investment and new technology, thereafter committing resources, and noticing that now the rewards cannot be sent home.

Blank (1)	Blank (2)	Blank (3)
(A) Prosperity	(D) At the very outset	(G) Repatriating profits
(B) Immigration	(E) Expressed politely	(H) Using expertise
(C) Globalization	(F) Conveyed harshly	(I) Signing deals

### Exercise No. 3

**Directions:** Choose words from the options that logically fit the blanks.

1. In order to ensure continued success, a company should indulge in (1)\_\_\_\_\_ introspection and look within. A realistic estimate of one's strengths and weakness should be the purpose behind indulging in such a 'know itself' exercise. As modern-day businesses are highly competitive, a firm's ability to (2)\_\_\_\_\_ respond to the continuously changing external environment starts with this ability to understand where it stands with respect to its competitors. A clearly visualized self concept initiates the process of (3)\_\_\_\_\_ interacting with the ever-changing external business environment.

Blank (1)	Blank (2)	Blank (3)
(A) A somewhat subjective	(D) Progressively	(G) Successfully
(B) A periodic	(E) Isometrically	(H) Delectably
(C) Ordering a sporadic	(F) Dynamically	(I) Wistfully

2. Since time immemorial, mankind has been using wind energy because the only dependable and customary source of energy to run mechanical operations were windmills and watermills, but the wind turbines that generate electricity today are (1)\_\_\_\_\_ on account of tremendous development in technology.

#### Blank (1)

- (A) Innovative (D) Affordable  
 (B) Economical (E) Subversive  
 (C) Perfunctory

3. Trepanation, the surgical drilling of holes in the human skull, was a medical intervention practiced about 9,000 years ago presumably to cure patients of epilepsy, migraine, skull fractures and certain mental disorders. Many of the prehistoric and pre modern trepanated skulls had signs of skull tissue regrowth indicating that the surgery was (1)\_\_\_\_\_. There is also some evidence that trepanation was also a form of emergency surgery to treat victims of battle with head injuries (2)\_\_\_\_\_ with primitive weapons like the clubs and slings. Typically, (3)\_\_\_\_\_ of a fractured skull were removed and blood clots underneath the injured spot were cleared by surgeons.

#### Blank (1)      Blank (2)      Blank (3)

- (A) Not fatal (D) Pummelled (G) Severed fragments  
 (B) Absolutely lethal (E) Guaged (H) Indispensable parts  
 (C) Multiple invasive (F) Inflicted (I) Intact chunks

☞ Perfunctory = cursory, mechanical, slapdash.

☞ Sporadic = spasmodic, fitful, infrequent.

☞ Fatal = deadly, lethal poisonous.

4. The art center was conceived as a labor of love with visitors not being charged. Neither was there any registration nor membership charges being levied from the public. However, this initial largesse was meant to only induce trial. To make the venture sustainable in the long run, it has now become imperative - given the costs - to think of ways to (1)\_\_\_\_\_ it. As of now, clarity has not emerged about how to (2)\_\_\_\_\_ but the management is toying with various ideas to woo visitors, including a scheme where patrons are provided an array of services that presumably will help ensure (3)\_\_\_\_\_ flow of visitors and, of course, funds.

Blank (1)	Blank (2)	Blank (3)
(A) Monetize	(D) Repay the investors	(G) Frequent
(B) Waver	(E) Trivialize the matter	(H) Steady
(C) Solemnize	(F) Effect the transition	(I) Sporadic

5. Professional sport seems to be getting dirtier by the day and the players appear more like (1)\_\_\_\_\_ than participants who are there to play hard but fair. The build-up to events and the choice of words also (2)\_\_\_\_\_ that journalistic ethics seems to have been relegated to the backburner. Take for instance, a description of a Formula 1 car race. The teams are described as rugged outfits and the event a war to be savored. The current champion is extolled as the (3)\_\_\_\_\_, a future talent as heir apparent, and the venue as the center stage for an epic battle.

☞ Trivialize = make small, blurt, burble.

☞ Obfuscate = confuse, make dense.

☞ Jettison =

1. To throw or drop from an aircraft or ship.
2. Abandon or discard.

Blank (1)	Blank (2)	Blank (3)
(A) Fending gladiators	(D) Obfuscate the idea	(G) King of the arena
(B) Unattractive gargoyles	(E) Mask the notion	(H) Star in the galaxy
(C) Mute observers	(F) Vindicate this observation	(I) Cornerstone of the game

6. In 'Power Trip', Amanda Little discusses the unprecedented blackout of 2003 that caught many Americans (1)\_\_\_\_\_. She unwinds the clock, going back a hundred years, and traces Henry Ford's passion to mass produce and market cars. She describes the American love for big, fast cars and their (2)\_\_\_\_\_ about oil not being a perennial energy source. Thereafter, she touches upon green energy pioneers but throughout her narrations shies away from voicing her opinion and hence Little's work is reportage, (3)\_\_\_\_\_. She does manage to keep the reader engrossed.

Blank (1)	Blank (2)	Blank (3)
(A) Napping	(D) Blissful unawareness	(G) But not of the prosaic kind
(B) Splurging	(E) Genuine concerns	(H) Full of boring anecdotes
(C) Jettisoned	(F) Pontifical approach	(I) Leaving the reader in the lurch



7. It is interesting to note that science is (1) \_\_\_\_\_ American political leadership, while religion comes easy to them. Hence, the glaring difference in response to the two events, ‘Faith Forum’, a platform to project the religious allegiances and convictions of the presidential candidates and ‘National Science and Technology Summit’, which focuses on R & D in Science in the US. This disparity is a (2) \_\_\_\_\_ as it is likely to influence the outcome of elections and make it a (3) \_\_\_\_\_ in which the heart rules.

Blank (1)	Blank (2)	Blank (3)
(A) Not the forte of	(D) Slippery situation	(G) Speculative theory
(B) A piece of cake for	(E) Cause for concern	(H) Subjective affair
(C) Not a difficult proposition for	(F) Glaring deficit	(I) Noteworthy change

8. There is a clearance both from the US Food and Drug Administration and the European Food Safety Authority that food from cloned animals is safe. Yet, there are (1) \_\_\_\_\_ in the market. Therefore, the future of these products for consumption seems (2) \_\_\_\_\_. In a nutshell, the consumer is the ultimate (3) \_\_\_\_\_.

Blank (1)	Blank (2)	Blank (3)
(A) Putrefied products	(D) Bleak	(G) King of the market
(B) No classified advertisements	(E) Pejorative	(H) Loser in the bargain
(C) No takers	(F) Sprightly	(I) Beneficiary of the product

9. Can the law of ‘presumed consent’ – that is, everyone is a potential donor unless he/she opts out – bridge the growing gap between the demand and supply of human organs for transplantation? A/An (1) \_\_\_\_\_ issue. Doctors, world over, are raising serious questions for they find that the donated organs are not always used: they feel that no objection to the law does not mean (2) \_\_\_\_\_ of it. Donation of organs is a humanitarian issue, so needs to be guided by (3) \_\_\_\_\_ and not force.

Blank (1)	Blank (2)	Blank (3)
(A) Contentious	(D) Delirious	(G) Contrivance
(B) Imminent	(E) Denial	(H) Compassion
(C) Posthumous	(F) Acceptance	(I) Quintessence

10. The champions of carbon reduction markets are facing a (1) \_\_\_\_\_ task probably due to lack of specific policy guidelines and also hardships in implementing the generic ones. This is further (2) \_\_\_\_\_ by the overenthusiastic observations of climate change scientists, who sound more like soothsayers and less like scientists. The silver lining, however, is that the powerful countries continue to (3) \_\_\_\_\_ shoulder to climate change science while the rest of the world has turned the other way round to the idea of carbon markets.

Blank (1)	Blank (2)	Blank (3)
(A) Gargantuan	(D) Isolated	(G) Lend their
(B) Ubiquitous	(E) Savored	(H) Rub their
(C) Specious	(F) Confounded	(I) Offer a cold

☞ Forte = strength, strong point.

☞ Sprightly = bubbly, joyous, feisty.

☞ Pejorative = deprecatory, abusive remarks; demeaning statements.

### Exercise No. 4

**Directions:** Choose words from the options that logically fit the blanks.

1. In the USA, in future presidential contests, money is going to rule the roost, what with the (1)\_\_\_\_\_ the US supreme court, allowing corporate houses to extend their financial support to the presidential candidates for campaigning. The present US president (2)\_\_\_\_\_ the ruling, saying it would muffle the common man's voice while the rich and the powerful will bulldoze their way. However, some stalwarts hailed it as a/an (3)\_\_\_\_\_ for free-speech.

**Blank (1)**      **Blank (2)**      **Blank (3)**

- |               |              |                 |
|---------------|--------------|-----------------|
| (A) Dulcet    | (D) Deplored | (G) Boomerang-  |
| words from    |              | ing effect      |
| (B) Overbear- | (E) Black-   | (H) Outstanding |
| ing attitude  | listed       | victory         |
| of            |              |                 |
| (C) Benchmark | (F) Obtruded | (I) Mandatory   |
| ruling from   |              | requirement     |
2. The Americans and the British relish their chocolates but the tastes of Americans and British are distinct. Therefore, the acquisition of British Cadbury, mainly a confectionery marketer, by American Krafts Food, which markets almost everything, from chocolates to convenient meals, seems at the outset (1)\_\_\_\_\_; yet it is a deal that is expected to result in absolute harmony. The twosome, in spite of their antithetical

business cultures, will (2)\_\_\_\_\_ each other fantastically in the growing market scenario, observe some market experts. However, some skeptics describe this amalgamation as a (3)\_\_\_\_\_ because at the very bottom, there is a sharp difference in the ethos of these chocolate giants.

**Blank (1)**      **Blank (2)**      **Blank (3)**

- |                |             |                   |
|----------------|-------------|-------------------|
| (A) Incongru-  | (D) Compli- | (G) Coalition of  |
| ous            | ment        | likeminded        |
|                |             | people            |
| (B) Sacrosanct | (E) Stash   | (H) Marriage of   |
|                |             | convenience       |
| (C) Irretriev- | (F) Comple- | (I) Power to con- |
| able           | ment        | trol each other   |
3. The south pole, the size of the US and Mexico combined, which has complete days of light and dark, where the world's 24 time zones meet, has many unique features and the most unusual (1)\_\_\_\_\_ is time, posing before the humans who arrive there, the weird task of setting their clocks to the standard time.

**Blank (1)**

- |                 |                |
|-----------------|----------------|
| (A) Combination | (D) Rationale  |
| (B) Phenomenon  | (E) Permafrost |
| (C) Proposition |                |

☞ Dulcet = sweet, melodious, euphonious, harmonious.

☞ Incongruous = incompatible, unmatchable, unsymmetrical.

☞ Obtrude = impose, force, shove, push.

☞ Stash = conglomeration, agglomeration, accumulation.

☞ Rationale = logic; a statement of reasons to support a point.



4. Social scientists have often (1) \_\_\_\_\_ the root cause behind poverty especially American poverty, but failed to determine the underlying forces although they sometimes claimed that it could be because of structural failure, such as the (2) \_\_\_\_\_ of the economy to generate the required employment opportunities. Some viewed poverty as the result of personal failure, like the absence of skilled and educated work force and desirable labor market skills. Poverty researchers, on the other hand, focused on who loses out at the economic game, rather than (3) \_\_\_\_\_ the fact that the game produces losers in the first place.

Blank (1)	Blank (2)	Blank (3)
(A) Deliberated	(D) Regression	(G) Addressing on
(B) Questioned	(E) Incompetence	(H) Controlling about
(C) Pander to	(F) Intervention	(I) Analyzing

5. Carl Jung, initially a/an (1) \_\_\_\_\_ of Freud, later disagreed with him on the issue that all unconscious motives were rooted in only the (2) \_\_\_\_\_ aspects of a person. He coined the term ‘collective unconscious’ to refer to both an individual’s subconscious and certain other beliefs that a person may acquire from his ancestors. In this manner, Jung tried to explain human behavior from a (3) \_\_\_\_\_ perspective.

Blank (1)	Blank (2)	Blank (3)
(A) Vehement critic	(D) Societal	(G) Radical
(B) Ardent follower	(E) Emotional	(H) Realistic
(C) Contemporary writer	(F) Physiological	(I) Psychological and cultural

6. The year 2008 proved to be (1) \_\_\_\_\_ for the American economy and experts predicted that worse is yet to come which would lead to complete market crash. The crisis was because of the recession in the financial and housing market. But the financial experts came forward with a different perspective and a more viable reason. According to them, it is the soaring oil prices that (2) \_\_\_\_\_ the market crash. Experts foresee that the crude oil prices may rise further. The economy is in a (3) \_\_\_\_\_ mood while the oil prices sky rocket. The public speculate that may spell the doom for the economy.

Blank (1)	Blank (2)	Blank (3)
(A) Overbearing	(D) Precipitated	(G) Combative
(B) Hyperbolic	(E) Burdened	(H) Lethargic
(C) Tumultuous	(F) Softened	(I) Resurgent

7. Troy’s latest model, the face of the green vehicle movement, has now become a problem child adding further to the existing (1) \_\_\_\_\_ of the world’s leading manufacturer of cars, which seems to (2) \_\_\_\_\_ its own principles, ‘lean manufacturing’, and ‘quality’. Regrettably, this may cause the car giant’s (3) \_\_\_\_\_.

Blank (1)	Blank (2)	Blank (3)
(A) Woes and woes	(D) Aggrandize	(G) Declension
(B) Red-tapism	(E) Bolster	(H) Ebullience
(C) History	(F) Compromise	(I) Trepidation

☞ Declension = decline, slope.

☞ Empathy = complete identification with the feelings of another person.

8. It is often noticed that among chronic drug abusers brain functions get affected making them (1)\_\_\_\_\_ and in the process they ignore all impending dangers and their consequences. Treatment of these abusers, to avoid (2)\_\_\_\_\_, therefore needs a holistic approach as very often their problems are (3)\_\_\_\_\_ by various sociometric factors, stress being the major contributor. For incarcerated offenders personalized modules of treatment can prove to be more successful.

**Blank (1)**                      **Blank (2)**                      **Blank (3)**

- (A) Compulsive offenders (D) Recidivism (G) Aggravated  
 (B) Absolute dependents (E) Aggression (H) Confronted  
 (C) Suicide prone (F) Hysterical (I) Regulated
9. The abundance of talent in a (1)\_\_\_\_\_ child is not necessarily a blessing. Such talent is normally not backed by (2)\_\_\_\_\_ as these children may not feel the need to concentrate for long spells. They achieve much with little effort, while others their age struggle. Thus, perseverance - a trait that is a prerequisite for higher-order learning-usually (3)\_\_\_\_\_.

☞ Recidivist = a convicted criminal who re-offends.

☞ Exacerbate = make something worse.

- Blank (1)**                      **Blank (2)**                      **Blank (3)**
- (A) Tenacious (D) Due application (G) Is present in excess  
 (B) Precocious (E) Parental support (H) Remains uncultivated  
 (C) Dyslexic (F) Societal encouragement (I) Blossoms prematurely

10. Today 'Mangroves', which have the power to reduce dangers of climate change and protect coastal communities, have become one of the world's most endangered ecosystems, mainly due to the insensitive (1)\_\_\_\_\_ of resources and other unhealthy practices adopted by humanity. The Caribbean has the second highest rate of mangrove habitat loss; The coastal (2)\_\_\_\_\_ is likely to worsen because of the severe weather conditions which are common in the region, (3)\_\_\_\_\_ by climate change.

**Blank (1)**                      **Blank (2)**                      **Blank (3)**

- (A) Exploitation (D) Sustainability (G) Exacerbated  
 (B) Effects (E) Vulnerability (H) Confronted  
 (C) Measures (F) Compatibility (I) Suppressed

## Exercise No. 5

**Directions:** Choose words from the options that logically fit the blanks.

1. Do saturates increase the risk of heart disease? Saturated fat is (1)\_\_\_\_\_ is the modern notion. Therefore, the results of a recent study disclaiming the earlier findings that saturates have adverse effects on the heart should not come (2)\_\_\_\_\_. But it certainly is perplexing that the 'Dietary Guidelines Advisory Committee' (DGCA) recently made a suggestion for the whole population, calling for a reduction in saturated fat to 7% of the diet, which is even more confining than before, in spite of (3)\_\_\_\_\_ new statistics.

- Blank (1)**                      **Blank (2)**                      **Blank (3)**
- (A) Not nefarious (D) As a surprise (G) Assuring  
 (B) Most dangerous (E) With a pinch of salt (H) Conflicting  
 (C) Relatively uncontrollable (F) As gospel truth (I) Harrowing

2. The Sun and the rotation of the Earth are the (1)\_\_\_\_\_ forces that control the complex ocean currents. Water from the tropical regions moves to higher altitudes because of the (2)\_\_\_\_\_ currents of the Gulf stream. Remote sensing technology on satellites now facilitates scientists to (3)\_\_\_\_\_ the features of Gulfstream currents and study their paths closely.

Blank (1)	Blank (2)	Blank (3)
(A) Compulsive	(D) Robust	(G) Delineate
(B) Key	(E) Languid	(H) Retrace
(C) Repository	(F) Torpid	(I) Define

3. The influence of social events on literary works in sixteenth-century England was (1)\_\_\_\_\_ as such works can never be created in isolation.

Blank (1)
(A) Unpredictable
(B) Undeniable
(C) Unnecessary
(D) Underplayed
(E) Undermined

4. How long will it be before the tension blows up into a major crisis between the belligerent neighbors is the million dollar question doing the rounds amidst the political bigwigs. The answer was almost there when one of the aggressive countries began military exercises sending an (1)\_\_\_\_\_ to its nuclear-armed neighbor and blaming it as the (2)\_\_\_\_\_.

Blank (1)	Blank (2)
(A) Unmistakable warning	(D) Perpetrator
(B) Unwanted provocation	(E) Arbitrator
(C) Unnecessary solicitation	(F) Imposter

5. The striking genetic (1)\_\_\_\_\_ between humans and the sea urchins is causing (2)\_\_\_\_\_ among biologists world over because they contend that by studying in detail the DNA of Sea Urchins, which share more than 7,000 genes with humans, doors will open to finding a cure to diseases like Alzheimer's, Parkinson's, cancer, and infertility, causing a revolution in medical history.

Blank (1)	Blank (2)
(A) Refinement	(D) Great excitement
(B) Similarity	(E) Anxious moments
(C) Clout	(F) Perennial problems

6. A monopsonized market is where a buyer but not a seller controls a large (1)\_\_\_\_\_ of the market and drives the prices down. A monopsonist is a single vendee in a market who can decrease the price of a commodity, triggering an economic (2)\_\_\_\_\_. A monopsonized market will therefore have the same features as the other markets but is (3)\_\_\_\_\_ in its own way.

Blank (1)	Blank (2)	Blank (3)
(A) Combination	(D) Incompetence	(G) Outmoded
(B) Division	(E) Evaluation	(H) Vague
(C) Proportion	(F) Downturn	(I) Unique

7. Ambitious business managers are avid about learning and assimilating nuances in business propositions involving profit making, but are (1)\_\_\_\_\_ about human rights and give carbon footprints a step motherly treatment and this is (2)\_\_\_\_\_.

Blank (1)	Blank (2)
(A) Heedless	(D) A quagmire
(B) Ardent	(E) An antiquated behaviour
(C) Empathetic	(F) A cause for concern

☞ Languid = weak or faint from illness or fatigue.

☞ Perpetrator = performer (usually of crime).

☞ Outmoded = old-fashioned, outdated.

8. Epigenetics is vociferous that genes do have 'memory' and remember to transmit traits to descendents. If genes could be manipulated to suffer from amnesia, we could (1)\_\_\_\_\_ control on our lives.

**Blank (1)**

- (A) Enhance (D) Indulge in  
 (B) Mitigate (E) Rectify  
 (C) Publicize
9. Childhood is a stage of confusion and dependency as children lack the capacity to decide or enact what they perhaps might want to do, if left unattended. Dependency is (1)\_\_\_\_\_ and reinforced by some doting parents. However, when children start entering adulthood, they (2)\_\_\_\_\_ decisions taken by adults for them. At this stage, all teaching might be considered as preaching, sometimes engendering hatred to learning itself. Once these neo-adults are allowed to learn through exploration, adventure, and discovery, they (3)\_\_\_\_\_ and participate in learning with renewed enthusiasm.

☞ Mitigate = alleviate, appease.

☞ Ecstasy = extreme joy, bliss, elation, euphoria.

☞ Camouflaged = inconspicuous.

**Blank (1)****Blank (2)****Blank (3)**

- (A) Intentional- (D) Accept (G) Experience  
 ly followed impartially ecstasy  
 (B) Specifically (E) Tend to (H) Overcome  
 highlighted resent inhibition  
 (C) Unwittingly (F) Submit will- (I) Demonstrate  
 encouraged ingly proficiency

10. There is a visible shift against the (1)\_\_\_\_\_ media culture, which tends to provoke passions. A new communication vehicle, the internet, that has grown by leaps and bounds, finally entails the opportunity to (2)\_\_\_\_\_ the one-sided picture propagated by the tycoons of news media network. It is heartening that the public is now ruled by (3) \_\_\_\_\_ and not by emotions.

**Blank (1)****Blank (2)****Blank (3)**

- (A) Camou- (D) Neutralize (G) Reason  
 flaged  
 (B) Feeble (E) Confirm (H) Compulsion  
 (C) Dominant (F) Accept (I) Strategy

# CHAPTER 7

## Critical Reasoning

### **Introduction**

In addition to the conventional questions on reading comprehension, with the *GRE® Revised General Test*, ETS has introduced questions that require ability to reason and evaluate arguments. This chapter aims at providing all the concepts that are needed to answer such questions easily.

### **What the Questions Look Like**

Arguments are short passages that comprise:

- Some basic information.
- The author's position based on that information.

### **Example:**

During the last one year, there were five major train collisions resulting in over 300 deaths, more deaths than in any previous years. Therefore, train travel has become more dangerous.

The first sentence is the basic information while the second is the author's position based on that information.

An argument consists of three components:

Evidence / Premise + Assumption (not stated) = Conclusion

$$E + A = C$$

- A premise or evidence is the supporting fact or information that is explicitly stated in the passage.
- The assumptions in an argument are made by the writer but are implicit (not stated).
- Assumptions form the foundation of an argument and whether the underlying assumption in an argument is



### **Tips**

The first step towards critical reading is to keep your purpose in mind while you read: You should read analytically and ask lots of questions.

proved incorrect or is rendered doubtful, the argument is weakened. Likewise, if the assumption is validated, the argument becomes quite convincing. It can also be said that the assumption brings the evidence and the conclusion closer. In other words, it is the unstated premise of an argument.

- The conclusion is the final statement deduced from the assumption and the evidence presented. It is the main idea about which the writer tries to persuade the reader. It is the claim the author wants the reader to believe.

## How to Identify Conclusion and Premise?

### Words that Indicate Conclusion and Premise

#### Conclusion Indicators:

- |                |                   |            |             |
|----------------|-------------------|------------|-------------|
| • Accordingly  | • Hence           | • So       | • Therefore |
| • As a result  | • Indicates       | • Should   | • Thus      |
| • Consequently | • It follows that | • Suggests |             |

#### Evidence/Premise Indicators:

- |                  |           |               |               |
|------------------|-----------|---------------|---------------|
| • Since          | • Because | • Furthermore | • Besides     |
| • As a result of | • Suppose | • Moreover    | • In addition |

#### Remember!!!

- Though indicator words may help to identify the conclusion and the premise, a more logical way is to understand the argument completely.



#### Tips

Read strategically. Identify the topic, scope and purpose of the argument. To analyze the argument, identify the premise, the conclusion, and the assumption of the argument.

Analysis of arguments requires effective critical reasoning skills and these skills are tested by ETS in many ways. However, the questions based on critical reasoning skills usually are of the following types:

1. Assumption.
2. Strengthening.
3. Weakening.
4. Similarity.
5. Evaluation.
6. Completion.
7. Bold faced.
8. Inference.
9. Completion.
10. Resolution of a paradox.



#### Tips

Look out for wrong answer choices that provide information not mentioned in the passage. Beware of answer choices that provide information supported by the passage but not the right answer for the questions.

The questions are worded in various ways, some of which are given below.

1. The author of the argument seems to be assuming that...
2. The claim made in the passage is best supported by...
3. The claim made in the passage is weakened most by...
4. The assertion made in the passage is similar to...
5. Which of the following would be most useful to establish in order to evaluate the argument above?
6. Which of the following can be the missing premise that is needed to logically complete the argument above?

7. The two bold-faced statements in the passage are related to each other in which of the following ways?
8. Which of the following can be logically inferred based on the information provided in the passage?
9. Which of the following statements could logically follow the last sentence of the passage?
10. Which of the following explanations can help resolve the paradox?

### Sample Questions Critical Reasoning

1. Traditionally, companies used most of their promotional budget for advertising in print or electronic media that tries to lure the customer to a retailer's shop than investing in recruitment of door-to-door salesmen for direct selling to customers. However, recent studies indicate that top-rated marketers of novel home appliances relied significantly more on door-to-door selling than on advertising. Hence, Sheen and Shine should promote its furniture range by using most of its budget on recruiting more door-to-door salesmen and spending less on using the services of its advertising firm.

The conclusion above is based on which of the following assumptions?

- (A) The leading furniture companies will strive to hire top-notch salesmen from the home appliances industry.
- (B) It has not been firmly established till now whether direct selling contributes more to a company's revenue or advertising does.
- (C) Advertising helps in building the image of a company whereas direct selling helps in making a customer understand how to use and maintain products.
- (D) The marketing techniques that are suitable for successfully promoting novel home appliances can be replicated and would help in selling furniture.
- (E) Details of the marketing strategies adopted by successful companies are seldom, if ever, made public.



#### Tips

The assumption questions always connect the premise and the conclusion. The assumption is essential to the argument.

**Ans. D**

**Explanation:** The conclusion that Sheen and Shine should promote its furniture range in the same way that top rated marketers of novel home appliances do, implies that the marketing techniques that have been successfully used to promote novel home appliances can be duplicated and would help in selling furniture.

2. Surveys conducted by leading business magazines reveal that business education has become essential to succeed in the corporate world and several graduates from most of the top ranked business schools either run their own businesses or are executives in well-known companies. A report by a reputed magazine has conclusively established that several school dropouts have successfully managed their own start up ventures or helped in the growth of their family owned businesses.

Which of the following explanation can help resolve the paradox?

- (A) In recent years, the number of students who get selected to the top ranked business schools has been steadily increasing while the number of school dropouts who start their own ventures or help in the growth of their family owned businesses has been declining.



#### Tips

In a paradox type question, two sets of facts seem to contradict each other. Don't look for a premise and conclusion. Instead, find the facts that are in conflict.

- (B) Graduates from top ranked business schools often do not know the intricacies of the corporate world because they have not been educated in a hands-on experience and this has made them as ignorant of practical business strategies as school dropouts might be.
- (C) The school dropouts had been invariably brought up in an environment that promoted sharp business acumen and that enabled them to acquire all the knowledge that would be imparted to students of top ranked business schools.
- (D) Typically, those who conduct surveys are able to track business school graduates but cannot contact those who discontinued their studies and hence those surveys do not include the names of school dropouts who succeeded in business.
- (E) All the school dropouts were child prodigies, who were more advanced in their understanding than what was required by school curriculum and having shown no interest in studies were wrongly dismissed from their schools on grounds of inability to master any subject.

**Ans. C**

**Explanation:** The environment supplied the school dropouts with the same essential knowledge required to succeed in the corporate world as was acquired by the graduates from top business schools and were therefore successful in business.

3. Residents of a particular region in the country Ingora became very fond of the staple food *gongoren* and it became a preferred food throughout the country. The consumption of *gongoren* steadily increased till 1995 but witnessed a somewhat drastic decline thereafter. It was felt that this was because the *gongoren* leaves in the region had lost their flavor.

Which of the following, if true, most strongly supports the claim above about the dramatic loss of flavor of the *gongoren* leaves?

- (A) Agricultural scientists identified and developed alternatives to the *gongoren* plant which supplied the flavored leaves and these were freely made available to the farmers of the region in which the consumption of *gongoren* leaves declined drastically after 1995.
- (B) A particular pesticide that farmers started using from 1995 to increase the yield of *gongoren* leaves adversely affected the growth of bacteria that was responsible for providing the requisite flavor without which the residents of the particular region would have no reason to consume *gongoren* leaves.
- (C) *Gongoren* leaves naturally lose their flavor if they are not harvested at the right time and this happened in several areas and during several seasons in the years before 1995 resulting in significant crop losses and a sharp rise in the wholesale and retail prices of the *gongoren* leaves .
- (D) The flavor of the *gongoren* leaves cannot be attributed to climatic and weather conditions thought to be favorable to the cultivation of the *gongoren* plants and to be the causative factors for the presence of the characteristic flavor of the *gongoren* leaves.
- (E) *Gongoren* leaves have recently been discovered in laboratory researches to have properties not unlike those of other staple foods used by the people of the particular region and this may have been the reason people became fond of the *gongoren* as a staple food.



**Tips**

In order to strengthen an argument, find the premise, the conclusion, and the assumption. A premise that supports the assumption will be the right answer choice.

**Ans. B**



**Explanation:** The cause for the drastic decline in the consumption of *gongoren* leaves is believed to be due to the loss of the flavor of the *gongoren* leaves. If it can be established that the *gongoren* leaves did lose their flavor (because the bacteria responsible for providing the requisite flavor were adversely affected by the use of pesticides) then there is additional information that there is sufficient cause for the decline in the consumption of the *gongoren* leaves. This information supports the claim that *gongoren* leaves lost their flavor and this was the cause for the decline in the consumption of the *gongoren* leaves.

4. Meretricia High School has a four-and-a-half-day tutoring schedule and the second half of Friday (2 pm to 5 pm) was optional library hours when about ten percent of the students were present in the library and used the place to study till 5 pm when the library closed for the day. It was observed that those who used the library on Friday from 2 pm to 5 pm, and seldom on other days, were the ones who attained top ranks in academics. The Principal, therefore, felt that making library attendance compulsory on Fridays would improve academic performance.



### Tips

In weakening questions, the right answer choice will contradict the assumption; and will weaken the link between premise and the conclusion.

Which of the following, if true, provides the most reason to doubt that the Principal's plan, if implemented, will achieve its stated purpose?

- (A) Making library attendance compulsory on Friday afternoons decreases the motivation of the ten percent who visit the library on that day.
- (B) A recent survey of the school has revealed that those students who are confident of scoring high grades do not wish to visit the library on Friday afternoons.
- (C) Few students visit the library on weekdays when such visits are optional and those who do are unable to perform well academically.
- (D) Reinforcing a week's tutoring with time spent in the library afterwards accounts for the improved academic performance of any student.
- (E) Studying on Fridays allows students to focus on self-study for at least three hours a week though only high achievers benefit from such a study.

**Ans. E**

**Explanation:** The principal expects that attending the library on Fridays compulsorily will improve academic performance. If the statement made by choice E is true, it will benefit only a limited number of students then the principal's plan will not achieve its stated purpose: that of improved academic performance among all the students.

5. Research conducted by the *Canine Health* magazine revealed that the health of dog owners was generally in a far better shape than those who did not own one. The magazine, therefore, strongly recommends that those who want to be healthy must go in for a dog. However, *Fitness Freak* magazine found that those who were otherwise healthy bought a dog when their jogging partner could not accompany them any longer.

In which of the following statements is the situation discussed similar to the one described in the passage above?

- (A) Those who marry did not live longer than those who did not marry, confirming that genetic predisposition regulates longevity.

- (B) Tom is not sick whenever he is not ill, therefore, Tom must be sick when he is ill.
- (C) It is foolish to interpret figurative language literally. Figurative language causes problems not just because it is not taken figuratively. It causes problems because it is not meant to be taken literally but is taken literally.
- (D) No one who desires to have a life free of troubles will make the mistake of not earning money. If a person earns money then all his problems are solved irrespective of the fact whether he desires to have a life free of troubles.
- (E) It is unusual for Roman generals to take sides in the struggle for the throne of imperial Rome. However, an exception has to be made when the general is also the son of the current Caesar. If this exception is not made then every Roman general who takes sides in a power struggle must be considered a traitor.

**Tips**

The answers to inference-based questions are not explicitly stated in the passage. To answer them, go beyond what is explicitly stated. The author may use language in a figurative manner and you may be asked to deduce the meaning based on the content given in the passage.

**Ans. A**

**Explanation:** In the argument the cause is shown to succeed and not precede the effect and therefore is not the cause of the effect. Dog owners are not healthy because they own a dog. They are already healthy and owning a dog comes later. Similarly, in choice A marriage is not the cause of longevity but individuals who already have the genetic predisposition to longevity live longer. The longevity genes precede the marriage and marriage is not the cause of longevity.

6. Shakespeare it seems was not untutored as there was some evidence that he was influenced by Greek epics. Some scholars have noticed a similarity between the descriptive style adopted by Homer and that used by Shakespeare while portraying the mindset of his characters. Therefore, Homer must have been the role model for Shakespeare.

Which of the following can be the missing premise that is needed to logically complete the argument above?

- (A) Shakespeare has often used historical figures as protagonists in his plays and therefore cannot be called an original playwright.
- (B) Shakespeare's comedies have depicted certain celestial beings which do not conform to the realism expected by a modern day reader and are not fully aesthetically satisfying.
- (C) Shakespeare's tragic heroes include figures such as Coriolanus who exemplify all the traits of a classical hero and therefore, Shakespeare must have had his education in classics.
- (D) What has been said about Shakespeare being influenced by Greek epic poems is factually correct and he considered only one writer as his role model.
- (E) Only Homer, of all the ancient Greek writers is worthy to be considered a role model and this is the reason why Shakespeare must have imitated him.

**Tips**

In an assumption question, the missing premise will complete the argument.

**Ans. D**

**Explanation:** The only premise that fits well in the argument is choice D. Unless it is true that what is said about Homer is correct and that Homer was the only writer that Shakespeare imitated, it cannot be concluded Homer was the role model for Shakespeare.



**Tips**

Inference questions are not clearly structured. These arguments are devoid of premises and conclusions. They contain a set of facts and information.

7. Appreciating the value of the currency of a country does not lead to decline in prices of wholesale commodities in that country. If this had been the case, in countries where the governments appreciate the currency the most the prices of wholesale commodities would have been the lowest. Further, when economists compared the prices of wholesale commodities across different countries, no correlation with appreciation of currency was noticed.

Which of the following can be logically inferred based on the information provided in the passage?

- (A) Unless there is an appreciation of the currency of a country the prices of wholesale commodities in that country will not decline.
- (B) If the prices of wholesale commodities in a country decline then it must be true that the currency of that country is appreciated.
- (C) No amount of appreciation of a country's currency will enable that country to avoid a recession if it is already experiencing an economic downturn
- (D) It is possible that the wholesale prices in a country will remain the same when the currency of that country is appreciated.
- (E) Countries of the world have often tried, albeit unsuccessfully, to control the prices of wholesale commodities by appreciating their currencies.

**Ans. D**

**Explanation:** If the prices of wholesale commodities are not affected by appreciation of a country's currency then it can be inferred that they may not fluctuate and may remain the same.

8. Karl Bhutaria is a master salesman who has almost always managed to attain the targets set by his insurance firm. He had accepted a target of 100,000 numbers for a new sales policy launched by his company in April and by the end of two quarters—April to June and July to September he had achieved only thirty-five percent of his target. Therefore, Karl Bhutaria will not be able to achieve his target for the current financial year.

Which of the following would be most useful to establish in order to evaluate the argument above?

- (A) Whether Karl intends to intensify his sales campaign in the next quarter so that he will be at least three quarters on the way to achieving his total sales target.
- (B) Whether Karl's sales promotion has caught the eye of his superiors who will increase his target figures in the light of the success already obtained by him.
- (C) Whether there have been other equally dynamic salespersons in fields other than insurance who have achieved their targets in spite of falling behind initially.

- (D) Whether Karl is ready to throw in the towel if he does not achieve 50% of his sales target by the end of two months.
- (E) Whether new sales policies sell more during the last two quarters of a financial year than in the initial two quarters of that year.

Ans. E

**Explanation:** It is necessary to know how the new policy will sell in the last two quarters of the financial year to conclude whether Karl will achieve his target. If the policy sells more during the latter two quarters of the financial year there is the possibility that Karl will sell the remaining 65% of the policies. Otherwise, he will not achieve his target as he has sold only 35% of the policies given as the target.



**Tips**

Questions relating to logic and structure measure your ability to comprehend logic inherent in a passage and your understanding of how certain parts within a passage are related to another part.

9. Which of the following statements could logically follow the last sentence of the passage?

It is a myth that camels store water in their humps when they come to an oasis and this stored water meets their body's need for water during their journey in the hot deserts. However, the humps have a practical utility, since \_\_\_\_\_.

- (A) No organ that is the result of a long period of evolution can be described as having limited or no practical utility unless it is proven to be a vestigial organ.
- (B) The hump is useful in carrying great loads, human and baggage, by dividing the weight and distributing it towards the extremities as well, thereby avoiding serious injury that might have otherwise distressed the animal.
- (C) Every part of an animal's body is meant to give it an advantage for surviving under adverse conditions and the hump spreads out the surface area of the camel's skin and helps it to cool its body by the increasing efficacy of the cooling process.
- (D) The camel is believed to be the ship of the desert because not only the hump of the camel but also all of its body parts have great practical utility.
- (E) The camels eat a lot of leaves, twigs and other similar food that is converted to fat and stored in the hump, which then supplies to its body the necessary nutrients during its journey in the barren deserts.

Ans. E

**Explanation:** The best way to complete the last sentence of the passage is to give an illustration of the practical utility of the camel's hump. Choice E states this.



**Tips**

Inference questions test your ability to follow the logical flow of an argument and to determine what follows logically from the information provided.

10. It is a well-known fact that trees breathe oxygen and exhale carbon dioxide during the day while they inhale carbon dioxide during the night and release oxygen into the atmosphere at night. Typically, trees seem to produce oxygen only after it is really dark: from about 9 pm to 3 am. Some scientists have hypothesized that if

night-like conditions were somehow created for longer hours, trees could be fooled to produce more oxygen. This, in turn, would mean **lesser pollution on our planet that can lead to better health for all inhabitants of our planet**. However, this line of reasoning is rather narrow. Most parasites that attack trees are wiped out by the ultraviolet rays of sunlight. **Trees have enough immunity to sustain themselves against parasitical attacks for about seven hours but attacks longer than that could affect the health of trees**.

The two bold faced statements in the passage are related to each other in which of the following ways?

- (A) The first is a prediction that relates the consequence of an action; the second is the cause of the action.
- (B) The first is an opinion that integrates well with the position that the argument defends. The second is a counter example against the defense.
- (C) The first is a description of a present situation. The second is a generalization drawn from the present situation.
- (D) The first is a presumed benefit of a proposed course of action; the second is a ground that could be the basis for not accepting the recommended course of action.
- (E) The first is an indication of how things would have been if a particular course of action was avoided. The second is that course of action.



### Tips

For Bold-faced questions, each of the answer choices consists of two parts, one for each bold sentence. For the answer to be correct both the parts should be true.

**Ans. D**

**Explanation:** The first bold faced statement says that if trees are fooled into believing it is night time there would be more oxygen and less pollution and better health for all. Therefore, it gives the presumed benefit of a course of action. The second boldfaced part states that extended periods of darkness can make trees vulnerable to parasitic attacks. Therefore, it gives a ground for not accepting the recommended course of action, that of extending the periods of darkness for plant life.

## PRACTICE EXERCISES

### Exercise No. 1

*Which of the following best completes the passage below?*

1. If your property sits on a wetland ecosystem, ensure that the wetlands remain intact. According to the Ecological Society of America, wetlands act as a natural filter that keeps chemicals, excess nutrients and sediment from continuing through the water system. Forests along waterways also act as filters, so \_\_\_\_\_
  - (a) Preserving or planting trees along streams and rivers can also help to keep waterways clean.
  - (b) Eliminating or minimizing your use of harsh chemicals provides the surest way to protect global waters from chemicals.
  - (c) Design a home rainwater-capture system and gray-water reuse system to help maximize your home water use.
  - (d) Get involved with local initiatives to plan responsible water use systems and ensure that healthy waters become a component of any development initiative.
  - (e) Looking beyond energy use to address how practices like industrial agriculture and deforestation are contributing to greenhouse gas emissions is equally important.
2. A new survey on health care reveals that you may not be getting what you pay for when you check into

a U.S. hospital. It showed that people who either gained or lost their health insurance took more trips to the emergency room than those who had a stable insurance status. The findings are troubling when considering the 32 million Americans expected to become newly-insured under the healthcare law because regardless of their type of insurance, the newly-insured may have trouble getting an appointment to see a doctor.

***Which of the following, is an assumption made by the author?***

- (a) People may have to wait a few days before there is an open time.
  - (b) When emergency departments are crowded, patients who have serious problems are at risk for delayed treatment.
  - (c) People with Medicaid, the U.S. health insurance program for the poor, were the most likely to visit the ER.
  - (d) The number of ER visits even out as a person remains either insured or uninsured for more than a year.
  - (e) Eventually, (ER) utilization would go down as it could just be a short-term surge.
3. All flamingos are found in tropical and subtropical areas. The flamingo's most characteristic habitats are large alkaline or saline lakes or estuarine lagoons that usually lack vegetation. Lakes may be far inland or near the sea. A variety of habitats are used by flamingos: mangrove swamps, tidal flats, and sandy islands in the intertidal zone. The presence or absence of fish may have a great influence on the use of lakes by some flamingos.

***Which of the following can be inferred from the above information?***

- (a) Due to changes in the climate and water levels in their breeding areas, flamingo colonies are not always permanent.
- (b) Drought conditions may force some flamingo populations to relocate.
- (c) When flamingos migrate, they do so mainly at night as they prefer to fly with a cloudless sky and favorable tailwinds.

- (d) Most flamingos that migrate will return to their native colony to breed.
- (e) Other flamingos are not affected because of different food sources.

4. The mysterious drop in honey bee populations—often called colony collapse disorder for lack of a more specific name—has generated a long list of suspects that includes mites, viruses, malnutrition, and even cell phone radiation. Two new studies published in *Science* suggest that neonicotinoids, a class of widely used insecticides, may belong at the top of the list.

***Which of the following if true will weaken the above argument?***

- (a) Neonicotinoids have already been partially banned in Italy, Germany, and France for their possible role in colony collapse disorder.
  - (b) Results from the two new studies suggest that even doses of neonicotinoids that do not kill the bee immediately can have enough ill effect to eventually cause colony collapse.
  - (c) Bumble bees die off every winter and only the queen survives to found a new colony in the spring, it's easy to see how this could spell bad news for bumble bee populations.
  - (d) Previous research has found that neonicotinoids also make bees more susceptible to fungal pathogens.
  - (e) In some countries neonicotinoid remains one of the most uncommon pesticides, yet colony collapse disorder was conspicuously noticed.
5. Proton-beam therapy is massively expensive—\$100+ million facilities, each treatment twice as much as radiation—and not proven to be any safer or more effective than other cancer treatments. Yet, the U.S. hospitals are racing to build new proton-beam facilities.

***Which of the following best explains the paradox above?***

- (a) Proton-beam therapy has been around since the 1990s, but its oft-touted safety over radiation has not been conclusively proven.



- (b) The American Society of Radiation Oncology's recent review using data from thousands of patients finds no evidence that proton-beam therapy is superior.
  - (c) Proton-beam therapy has become the favored option for body parts where stray beams can be especially harmful.
  - (d) To foot the construction bill, hospitals will push the treatment aggressively to cancer patients.
  - (e) Hospitals can afford to build them because proton-beam therapy is 'extremely favorably reimbursed' by Medicare and many private insurance companies.
6. Shopping behavior varies by social class. For example, a very close relation between store choice and social-class membership has been found, indicating that it is wrong to assume that all consumers want to shop at glamorous, high-status stores. Instead, people realistically match their values and expectations with a store's status and don't shop in stores where they feel out of place.

***All of the following if true will render support to the fact that shopping behavior varies by social class EXCEPT:***

- (a) Childhood socialization patterns and educational influences may lead consumers to vary in many of their purchase behaviors across social class.
  - (b) Most women enjoy shopping regardless of their social class; however, reasons for enjoyment differ.
  - (c) The attraction to high-fashion stores was directly related to social class.
  - (d) Lower-status men who shopped in high-status department stores felt clerks and higher-class customers in the store 'punished' them in various subtle ways.
  - (e) No matter what the store, each shopper will tend not to patronize those where they feel they do not 'fit,' in a social-class sense.
7. An exit poll revealed that 2/3 of the public servants agreed that they were at least a little dishonest. However, the survey may underestimate the proportion of those who are dishonest, because some dishonest

public servants taking the survey might have claimed on the poll to be honest.

***Which of the following if true will strengthen the conclusion?***

- (a) Honest public servants who have claimed on the survey to be honest are those known for their integrity.
  - (b) Honest public servants taking the survey might have claimed on the survey to be dishonest.
  - (c) A survey reported that world around more than half of the public servants who are accused of corruption are convicted.
  - (d) Public servants who claimed on the survey to be dishonest may have been answering honestly.
  - (e) Some people who are not public servants are probably at least a little dishonest.
8. The police investigation has concluded that immediately prior to the crash, either the captain of the first boat changed the direction without signaling or the captain of the second boat was driving with excessive speed. Either action would make a captain criminally liable for the resulting crash and casualty. But a new satellite photo reported that the first boat's turn signal was not on, and the captain of first boat admitted to having changed the direction. Therefore, the captain of the second boat was innocent.
- Which of the following is an assumption on which the argument depends?***
- (a) The captain of the second boat would have seen the turn signal of the first boat flashing had the captain of the first boat turned it on.
  - (b) The captain of the first boat has an impeccable safe driving record.
  - (c) There is no other boat involved in the crash.
  - (d) The captain of the first boat knew the turn signal was on.
  - (e) The captain of the first boat did not know that the turn signal was on.
9. TV commercial: 95% of dentists surveyed prefer Snow White to all other brands of toothpaste. Why? Our research development has the best chemist in the city of Smallville to ensure you have the best

toothpaste on the market. So if you need toothpaste, use Snow White.

**Which one of the following, if true, casts MOST doubt on the above reasoning?**

- (a) Doctors of other specialties were excluded from the survey, which had rendered the survey samples unrepresentative.
  - (b) Few dentists participated in the survey, which had rendered the sample size too small to be reliable.
  - (c) All chemists in the city of Smallville had the same training and were equally qualified.
  - (d) This TV commercial appealed to the opinions of vulnerable consumers without special knowledge of oral hygiene.
  - (e) Using dental floss is preferable to using even the best toothpaste for many people.
10. Global economic crisis reduces to the problem of balancing supply and demand. Supply is strictly confined by the earth's capability in supplying raw material. Demand, however, is virtually unlimited,

as there is no limit on the potential demands created by human beings. The imbalance between supply and demand is inevitable. Therefore, any solution to global economic crisis requires reducing current human supply.

**Which one of the following is an assumption on which the above argument depends?**

- (a) Our economic system will crash eventually if the supply and demand remains unbalanced in the long run.
- (b) It is technologically feasible to quantitatively calculate the limitation of earth's supply of raw materials.
- (c) It is technologically infeasible to quantitatively calculate the limitation of earth's supply of raw materials.
- (d) Current human demand has exceeded the earth's sustainable supply of raw materials.
- (e) Increased human consumption does not increase the earth's sustainable supply.

## Exercise No. 2

1. Which of the following best completes the passage below?

Biologists use race classification in plants and animals in studying genetic differentiation at the population level; a process necessary in understanding speciation and evolution. Populations of plants and animals can be effectively isolated by some physical barrier (vast distances, mountain range, the oceans, etc.) so as to limit gene exchange to within their population; a requisite for race formation. However, this is now not the case with Human populations because \_\_\_\_\_

- (a) They are effectively physically isolated so as to produce the current racial differentiation.
- (b) What still remain are social and cultural barriers, based mainly on religious concepts.

- (c) Technological advances have removed the barriers that had previously separated human populations.
- (d) The historic separation of human populations has produced great variations in both physical characteristics and cultural aspects amongst humans.
- (e) Of racial classification on the basis of religious differences.

2. One of the major causes of degenerative disease, including cancer, is the accumulation of mutations in cells. Thus, if the accumulation of such mutations can be reduced, a measure of protection from these degenerative diseases may be afforded. Vitamin C may be such an agent. However, the dosage of Vitamin C may be critical-protective at low dosages but deleterious at higher doses.



*Which of the following is a possible conclusion regarding the use of Vitamin C in preventing degenerative diseases?*

- (a) Random Prescription of Vitamin C is unlikely.
  - (b) Patients suffering from cancer will be given less vitamin C.
  - (c) Consumption of fruits rich in vitamin C will become a norm.
  - (d) At a concentration of 1 gram/ml Vitamin C exerted a protective effect.
  - (e) Higher concentrations of Vitamin C induced chromosomal mutations.
3. Corruption is illegal everywhere in Africa, but it is woven deep into the fabric of everyday life. The African regional body, the African Union (AU) has drawn up a convention to stamp out malpractices. The AU's proposed solution is a convention which would provide countries signing up to it with a blueprint for tackling the problem. It proposes that all public officials should declare their assets when they take office, that governments should take powers to seize bank documents where necessary, and that those convicted should have their assets confiscated. Signatories would also have to agree to extradite those charged with corruption. With this plan in place Africa is soon going to get rid of corruption.

*Which of the following points to the most serious logical flaw in the AU's thinking?*

- (a) The fabric of Africa should be rid of corruption to save the continent.
  - (b) Increasing awareness of the damage Africa's corrupt reputation has done.
  - (c) The continent's more forward-looking leaders will arrest the problem.
  - (d) Corruption is costing the continent nearly \$150bn a year and it can be saved.
  - (e) Accountability and transparency are important only among public officials.
4. The MA Synthesis Report highlights four main findings: **Humans have changed ecosystems more rapidly and extensively in the last 50 years than in**

**any other period.** More than half of all the synthetic nitrogen fertilizers, first made in 1913, ever used on the planet have been used since 1985. **Experts say that this resulted in a substantial and largely irreversible loss in diversity of life on Earth,** with some 10 to 30 percent of the mammal, bird, and amphibian species currently threatened with extinction. Ecosystem changes that have contributed substantial net gains in human well-being and economic development have been achieved at growing costs in the form of degradation of other services.

In the report, the two portions in **boldface** play which of the following roles?

- (a) The first is a claim, the accuracy of which is disputed; the second is a conclusion drawn in support of the argument.
  - (b) The first is a finding, the accuracy of which is debated; the second is the conclusion of that debate.
  - (c) The first is an assumption drawn by the author; the second is the evidence provided in support of the assumption.
  - (d) The first is a finding, the accuracy of which is contradicted by the conclusion; the second is that confirmation.
  - (e) The first is a conclusion drawn by the author; the second provides the evidence.
5. Anger is an emotional state that varies in intensity from mild irritation to intense fury and rage. The instinctive, natural way to express anger is to respond aggressively. Anger is a natural, adaptive response to threats; it inspires powerful, often aggressive, feelings and behaviors, which allow us to fight and to defend ourselves when we are attacked. A certain amount of anger, therefore, is necessary to our survival.
- Which of the following is an assumption drawn by the author?*
- (a) Laws, social norms, and common sense place limits on how far our anger can take us.
  - (b) Expressing angry feelings in an assertive manner is a healthy way to express anger.

- (c) Unexpressed anger can create other problems such as passive-aggression.
  - (d) Anger turned inward may be detrimental to facing challenges.
  - (e) People who are constantly criticizing everything, haven't learned how to constructively express their anger.
6. 'Women hold up half the sky,' wrote Pulitzer Prize winners Nicholas D. Kristof and Sheryl WuDunn in their book 'Half the sky'. Yet that's mostly an aspiration: in a large slice of the world, girls are uneducated and women marginalized, and it's not an accident that those same countries are disproportionately mired in poverty.'

***What can be inferred from this?***

- (a) The key to economic progress lies in unleashing women's potential.
  - (b) The greatest exploited economic resource is the female half of the population.
  - (c) The book is essential reading for every woman who has faced exploitation.
  - (d) Women should overcome the many social constraints that befall them.
  - (e) Target women as they are effective agents of change.
7. Fifty feet above the storm-tossed North Sea, a thunderhead of birds has been massing. When the cloud-burst comes, it's quick as lightning. They plunge, a score of white tridents, spearing the waves with a thump and a splash. Moments later they bob to the surface, fish in throat. They shake their heads, rise from the water on six-foot wings, and soar to cliff side homes with a swan's grace. There they land badly and bicker loudly. These are northern gannets, far-ranging seafarers tethered seasonally to crowded colonies.

***Which of the following will provide a logical conclusion about the Gannets?***

- (a) They are birds of contrast.
- (b) They are champion divers.
- (c) They are hapless on land.

- (d) They are abundant.
  - (e) They are very swift.
8. Man-made global warming may have little effect on some common species of trees in the Amazon rainforest as they date back more than 8 million years and have survived through massive temperature fluctuations, scientists claim.

***Which of the following renders support to the above conclusion?***

- (a) The findings did not lessen the problems posed to the Amazon by deforestation.
  - (b) A study indicates that the older the age of the tree species, the warmer the climate it has previously survived.
  - (c) Scientists used a molecular clock approach by studying mutations in DNA to determine the ages of trees.
  - (d) Scientists predicted tree species extinctions in response to relatively small increases in global average air temperatures.
  - (e) Neo tropical tree species endured climates warmer than the present, implying they can tolerate near-term future warming under climate change.
9. US technology giant Amazon has devised a new motion-sensor technology for an airbag that can protect your gadgets including smart phones, cameras, and tablets from cracking when dropped. A traditional airbag in cars is deployed upon impact, cushioning the passengers' heads as they are thrust forward. The phone system hopes to use similar techniques to prevent damage to the mobile upon inevitable impact.

***Which of the following can be inferred from the above argument?***

- (a) The technology will release airbags to reduce potential damage.
- (b) From a logistical point of view, the handset would have to be rather bulky to hide an airbag.
- (c) The idea is the brainchild of retail and technology giant Amazon.

- (d) Prior to impact between a surface and a device, a determination of a risk of damage to the device is made.
- (e) The system uses motion sensors, already built into most smart phones, to detect when a phone has been dropped.

10. Which of the following offers the best conclusion?

Thailand has about two and half million migrant laborers, mostly from Burma, but only half a million have completed the required process known as nationality verification or NV. Thai labor authorities have extended previous deadlines but appear to be

firm on this latest one. Thai employers that depend on foreign labor worry because \_\_\_\_\_

- (a) If deportations proceed, their operation costs could be affected.
- (b) The United Nations agency opposes mass deportation.
- (c) Thai authorities are threatening to deport 35,000 migrant workers.
- (d) Countries have a right to deport illegal migrants.
- (e) Authorities are not ready to extend the regularization process.

# CHAPTER 8

## Reading Comprehension

### ***Introduction***

Reading comprehension, often referred to as RC, involves reading and understanding a given text. Evaluating the given content is also an integral part of reading comprehension. The text, in the context of the test, is normally the kind of prose one is likely to read during graduate studies.

### ***What is Reading?***

- Reading is the ability to interpret a given text.
- Reading speed is important especially under test conditions.
- Skimming and scanning the text is useful to get an overview of the content.
- Good reading habit, therefore, means half the battle won.



#### **Tips**

Reading too fast can mean compromising on comprehension.

### ***What is Comprehension?***

- Understanding the meaning and context of words in the text.
- Distinguishing what is relevant to the content.
- Drawing conclusions effectively.
- Interpreting the given information.
- Inferring information not provided in the text.
- Correlating the facts mentioned.
- Analyzing the view points of the author.
- Explaining the given text in a different perspective.

- Learning to read between the lines.
- Identifying the clues in the passage.
- Asking yourself relevant questions like:
  - (a) Why did the author make this statement?
  - (b) What words did the author use?
  - (c) What is the purpose of the author in writing the passage?
  - (d) What is the tone adopted by the author?

### **Structure of a Reading Comprehension Passage**



#### **Tips**

Base your answers on what is given in the passage and not on what you know.

- Passages may be from physical sciences, biological sciences, social sciences, arts and humanities and general topics.
  - Length of the passage (one to several paragraphs).
  - Number of passages (5 per section).
  - Number of questions (one to six on a given passage).
  - Mostly multiple-choice questions.
  - Some questions require selection of multiple-answer choices.
- Some questions require selection of a sentence from the passage.
  - Some questions test the meaning of a particular word.
  - Some questions require identifying the evidence that might weaken or strengthen a statement.
  - Some questions require interpretation of the passage.
  - Some questions require recognizing tone of the passage.

### **Strategies for Reading Comprehension**

- Base your answers only on the information provided; do not choose an answer based on information you know which may or may not be relevant to the passage.
- All passages may not contain information familiar to you. So, do not be discouraged when you encounter such passages. Tackle these passages later.
- Pay attention to the central idea of the passage.
- Identify the supporting ideas.
- Identify the connection among these ideas keeping in mind that there may be conflicting ideas.
- Read the first question before reading the passage.
- Before answering, read each question carefully and completely to understand what is being asked.

### **Type of Questions**

Multiple-choice/select one or more choices/select-in-passage questions



#### **Tips**

Cultivate the habit of making precise notes about the passage.

- *Multiple-choice questions:* These questions have five answer choices of which you must select one.
- *Select one or more choices questions:* These questions provide three answer choices and ask you to select all that are correct; one, two, or all three may be correct.
- *Select-in-passage questions:* These questions ask you to click on the sentence in the passage. Clicking on any part of the sentence will highlight the sentence.

Questions could be related to:

- Central theme.
- Implied meaning.
- Logical structure.
- Reasoning techniques used by the author.
- Tone used.
- Specific detail in a line or paragraph.

### **Tips for Answering Reading Comprehension Questions**

- Begin by identifying the central theme of the passage.
- Recognize supporting ideas.
- Read all answer choices before selecting the correct answer choice.
- Do not fall into the trap of a partially correct answer choice.
- Look for distortion of content.
- Remember you are looking for the meaning of the word in the context and not just the solitary meaning.



#### **Tips**

The information required to answer each question will always be in the passage. Be on the lookout for information in the passage that supports your choice.

### **Sample Questions**

**Read the Passage and Answer the Questions that Follow.**

Coral reefs are underwater structures made from calcium carbonate secreted by corals. Corals are colonies of tiny living animals found in marine waters containing few nutrients. Most coral reefs are built from stony corals, and are formed by polyps that live together in groups. The polyps secrete a hard carbonate exoskeleton which provides support and protection for the body of each polyp. Reefs grow best in warm, shallow, clear, sunny and agitated waters. Often called ‘rainforests of the sea’, coral reefs form some of the most diverse ecosystems on earth. Paradoxically, coral reefs flourish even though they are surrounded by ocean waters that provide few nutrients. They are most commonly found at shallow depths in tropical waters, but deep water and cold water corals also exist on smaller scales in other areas.

Coral reefs deliver ecosystem services to tourism, fisheries and shoreline protection. The annual global economic value of coral reefs has been estimated at \$30 billion. However, coral reefs are fragile ecosystems, partly because they are very sensitive to water temperature. They are under threat from climate change, ocean acidification, blast fishing, cyanide fishing for aquarium fish, overuse of reef resources, and harmful land-use practices, including urban and agricultural runoff and water pollution, which can harm reefs by encouraging excess algae growth.

Q1. According to the passage, all of the following statements are true EXCEPT:

- (A) Coral reefs are found only in shallow, clear and sunny waters.
- (B) Absence of nutrients in ocean water does not deter coral reefs from flourishing.
- (C) Coral reefs are endangered because of water contamination.
- (D) Coral reefs do not occupy a vast part of the ocean surface.
- (E) Ocean temperature is crucial for the survival of coral reefs.

**Explanation:** Questions which ask to identify the true or false statements are usually based on the entire theme or specific content of the paragraph.



**Tips**

Don't apply your personal opinion or knowledge. Instead, read the information that is mentioned in the passage carefully and base your answer on what is explicitly stated or can logically be concluded from the information in the passage.

*Refer to the sentence:* 'They are mostly \_\_\_\_\_ in other areas.' It shows that coral reefs are found even in deep waters. Hence, option (A) is false. The other options are true statements as they are mentioned in the passage.

Q.2. The passage provides information that helps answer all of the following questions about coral reefs EXCEPT:

- (A) How are coral reefs formed?
- (B) What are the threats to coral reef systems?
- (C) What are coral reefs called?
- (D) What protects coral reefs?
- (E) Where are coral reefs found?

**Explanation:** Everything about coral reefs is discussed in the passage except what protects them. Hence, choice 'D' is correct.

**Read the Passage and Answer the Questions that Follow.**

Emile Durkheim, a French sociologist, was the first social scientist to introduce and to use the concept of sociological realism. Of course, the idea of sociological realism was present in the writings of many of his predecessors. But, Durkheim used it not only as a conceptual tool but also as a perspective. His analysis of this concept bolstered the foundations of positivistic and functionalist traditions in sociology. What does Durkheim mean by sociological realism? When members of a society enter into a definite relationship, something more than an aggregate comes into existence. And, this reality, in due course of time, becomes independent of its constituent parts — the individual members. Thus, this perspective of social reality has been termed as sociological realism.

Q.1. Which of the following can be inferred from the passage?



**Tips**

To understand the author's attitude or tone observe how the author feels about something and the kind of words s/he uses.

- (A) Social scientists understood the idea of sociological realism.
- (B) Emile Durkheim's predecessors did not have a holistic approach to sociological realism.
- (C) Durkheim is the proponent of sociological realism.
- (D) Earlier, there was no positive approach to sociology.
- (E) Members of a society have a clear picture about their roles in society.

**Explanation:** inference-based Questions Require that you Draw Logical Conclusions.

The passage is about sociological realism. The main idea is about the definite relationships formed in the society. In this context, we can eliminate option (A) as it is already stated in the passage. Similarly, options (C&D) can also be eliminated. Option (E) is irrelevant. Members enter into a definite relationship but may not have an idea about the role they have to play. Option (B) is not stated but we can logically infer this from the statement ‘But, Durkheim used it not only as a conceptual tool but also as a perspective.’

Q.2. Which of the following would be the best title for the passage?

- (A) Sociological Realism: A Modern Perspective.
- (B) Positivism: A Tested Concept in Sociology.
- (C) Definite Relationship: A Strong Social Bond.
- (D) Emile Durkheim: A Pioneer Sociologist.
- (E) Sociology: A Tool to Study Society.

**Explanation:** A suitable title for a passage must reflect the central theme. Therefore, it should precisely include all key ideas mentioned in the passage. While answering such type of questions, students should bear in mind that words picked directly from the passage can be distracters.

Choice B is incorrect as the main idea is not about the approach adopted in social realism. Hence, talking about positivism is stretching the idea. Choice C is incorrect as the idea is too broad. The passage is not about relationship. Choice D is incorrect as the passage is surely not about Emile. He is not a pioneer and has predecessors. Choice E is incorrect as the idea is not mentioned anywhere in the passage. Hence, it is irrelevant. Answer choice A is correct. The passage talks about the modern approach to social realism which is a holistic approach.

**Tips**

If you're not sure of the correct answer, use the process of elimination. Make an educated guess and move on. If you have spare time, you may come back to that question later.

**Read the Passage and Answer the Questions that Follow.**

Political independence came to Ceylon in a totally different manner than it did to Burma. In the case of Ceylon, there was no Japanese occupation, no revolutionary fervor and no sudden break with the past. The colony did not even experience liberation struggle. There was no civil disobedience or non-cooperation and no imprisonment of national leaders. As there was no struggle in Ceylon, neither was there the usual concomitant of a struggle, the hardening of national solidarity through national sacrifice. Ceylon emerged from colonial rule through a process of peaceful negotiations, but this was not an altogether unmixed blessing. An essential element in the explanation of the unique way in which Ceylon achieved political independence is the fact that the process of Westernization had gone further there than in other colonial territories.



**Note:** For the following question, consider all the options separately and choose all that are relevant in the given context.

Q.1. Political independence in Ceylon was different because:

- (A) It was not based on any ideology.
- (B) It was not guided by national pride but by westernization.
- (C) The roots of the struggle were based on peaceful bargaining tactics.



### Tips

When dealing with questions on primary purpose, think why the author has written the passage. The purpose is to inform, criticize, refute a belief or clear a misconception. This can be determined only by skimming and thinking about the whole passage.

**Explanation:** To answer these type of questions, it is important to evaluate each answer choice separately.

*Answer choices are (A) and (C):* The passage states that independence came to Ceylon in a manner that was totally different from how it came to its neighboring countries. This indicates that there is no specific ideology. Hence, choice A is clearly the correct choice. The passage states that Ceylon got its independence through peaceful negotiations. Hence, choice C is correct. Choice B is only partially correct because it states that Ceylon was not guided by national pride.

Q.2. The author's attitude towards the political struggle adopted by the Ceylonese is best described as

- (A) Negative.
- (B) Skeptical.
- (C) Dispassionate.
- (D) Subjective.
- (E) Enthusiastic.

**Explanation:** In a conversation one can find out the speaker's attitude by paying attention to his intonation. In reading comprehension the author's attitude, mood, and tone can be identified from the qualifiers used, as they convey the author's attitude towards a subject or issue.



### Tips

In questions on main purpose, an option can be wrong because it goes beyond the scope of the passage or might not even be related to the theme of the passage.

What is the author's reaction to the method adopted by the Ceylonese to gain their independence? Choice A is incorrect as there are no negative words suggesting that the author dislikes the Ceylonese's approach. Choice B is incorrect because a skeptic is one who doubts or questions an accepted belief. The author is not questioning the method adopted by the Ceylonese. Choice D is also incorrect because the author has not given any subjective opinion. Choice E is incorrect: The author does not exhibit any enthusiasm. The right answer is choice C. The author is not happy or dissatisfied with the method adopted. Dispassionate means neutral or objective.

Q.3. In the context of the passage, 'concomitant' (line 7) most nearly means:

- (A) Associated consequence.
- (B) Supplementary detail.
- (C) Complimentary action.
- (D) Correlated deduction.
- (E) Anticipated result.

**Explanation:** Identify the meaning of the word in the context of the passage. It is important to understand the context and not just the solitary meaning of the word. Therefore, merely knowing the meaning of the word is not enough.

Answer is choice A. ‘Concomitant’, in the given context, means associated consequence.

## PRACTICE EXERCISES

### Exercise No. 1

#### Passage – 1

Read the passage and answer the questions that follow by choosing one option, unless stated otherwise.

Judicial activism is a philosophy of judicial decision making whereby judges allow their personal views about public policy, among other factors, to guide their decisions. Detractors of judicial activism charge that it usurps the power of the elected branches of government or appointed agencies, damaging the rule of law and democracy. Defenders of judicial activism say that in many cases it is a legitimate form of judicial review, and that the interpretation of the law must change with changing times. A third view is that so-called ‘objective’ interpretation of the law does not exist. According to law professor Brian Z. Tamanaha, ‘Throughout the so-called formalist age, it turns out, many prominent judges and jurists acknowledged that there were gaps and uncertainties in the law and that judges must sometimes make choices.’

☞ Skimming a text involves quick identification of words or phrases that are relevant.

To develop good reading speed, it is important to cultivate a good reading habit.

**Directions:** Consider each of the choices separately and select all that apply.

- According to the passage, critics opine that judicial activism:
  - Leads to proper legal analysis.
  - Helps in objective interpretation of the law.
  - Is detrimental to democracy.
- In the context of the passage, *usurps* most nearly means:
 

(A) Seizes	(D) Advocates
(B) Abjures	(E) Confuses
(C) Conjures	
- Select the sentence that indicates what the defenders of judicial activism base their argument on.

#### Passage – 2

Read the passage and answer the questions that follow by choosing one option, unless stated otherwise.

Like many other diseases, cancer too is multi-factorial. The reasons could be diverse. Genetic predisposition, the effect of carcinogens, and the effect of the environment, are some of the more common causes. Sometimes, though a person may not be congenitally

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predisposed to the disease, with age certain cells may turn cancerous. A carcinogen—a cancer-causing agent—or a strange tweak in the cells may trigger this malignancy during the stage of natural division. The numerous ideas propagated about the causes and cures have made the study of cancer rather contentious. Oncologists, till date, have not been able to explain why some people are more susceptible while others seem to be somewhat immune to the effects of this disease, which is debilitating at the least, and sometimes fatal. However, on the preventive front, a lot of advice is available. Tobacco, alcohol, poor diet, inadequate exercise, sunlight, radiation, certain hormones, some viruses and bacteria, chemicals, family history and being overweight have all been labeled culprits. All the available advice relates only to avoidance of it. However, one can do nothing about the genes that one inherits. In fact, as far as the methods adopted to cure cancer are concerned, till date, no one approach has been deemed indisputable by the medical fraternity. A new line of inquiry is creating interest and hopes that there may be a cure available for those who have become the victims of this dreadful disease. It may help the genetically predisposed groups too. The method involves attacking the cancer-causing stem cells, which can churn out new cells and simultaneously renew themselves. This could mean an altogether new focus of all oncological research and a new line of medication that targets the cancer-spewing stem cells.

☞ In ‘Main Idea’ questions, an option can be wrong because the information given in the option is false or only partly true, according to the information provided in the passage.

4. The author’s primary purpose in the passage is to:
- (A) Describe the formation and nature of cancerous cells.
  - (B) Imply that in future all research on cancer would be confined to the development of new types of drugs.
  - (C) Explain the various causes that increase the predisposition of a person to cancer.
  - (D) Discuss the possibility of a new and effective way of treating cancer.
  - (E) Compare the traditional methods of treating cancer with some recently evolving methods.
5. With which of the following statements is the author most likely to agree?
- (A) When it comes to advice pertaining to avoidance of cancer, little information is available.
  - (B) Cancer can be caused by an abnormal mutation of cells or be triggered by carcinogens.
  - (C) At present, stem cell correction or manipulation is the only way to treat cancer.
  - (D) The cost of stem cell based curative medicines is bound to be very high.
  - (E) Counseling of cancer victims is an area that has somehow been overlooked by experts.
- ☞ ‘Inference questions’ can easily be identified by watching for words such as infer, deduce, suggest, imply, most likely, and probably.

### Passage – 3

Read the passage and answer the questions that follow by choosing one option, unless stated otherwise.

There can be no denying the fact that solar energy is an effective source of power, one that is going to serve us for long. Despite the need to harness this energy, very little research has been conducted to make photovoltaic cells cost-effective and thereby available for utilization by masses for their various devices. Photovoltaic cells use sunlight and convert it directly to electricity without leaving any residual elements that can pollute the environs, and is therefore believed to be the energy source that could be available to mankind.

Besides being used in power generation, photovoltaic cells find applications in other non-space application programs. The ability of solar cells to help produce significant quantities of hydrogen, which has been difficult to produce on a substantial scale till now, is an encouraging sign as it indicates the possibility that hydrogen could be used as an alternative fuel source in future.

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Given this scenario, many people wonder why the scientific community is not aggressively promoting this naturally and abundantly available energy source. The fact is that the overall picture is not as sunny as it appears on the surface. The economics of generating solar power is a severe drawback and till date the efficiency levels have been far from satisfactory. Till now scientists seem to have maintained the unidirectionality of their research and focused only on single-crystal silicon cells, the efficiency of which is ridiculously low. Therefore, research funds, by and large, have been used for costly and inefficient silicon cells that seem to hold little promise even in the future. Extensive research on non-silicon based cells is the need of the hour as fossil fuels like petrol will be exhausted soon.

☞ While answering inference questions, remember that the information is not directly stated in the passage.

6. The primary purpose of the author is to:
- (A) Propose an alternative to silicon-based solar cells.
  - (B) Elaborate on the advantages of photovoltaic cells.
  - (C) Offer a critique of the utility and potential of solar cells.
  - (D) Compare traditional methods of generating power with those of solar electricity.
  - (E) Trace the origin of an invention that has massive potential.
7. The tone of the passage can best be described as:
- (A) Pedantic and impractical.
  - (B) Critical and deprecating.
  - (C) Argumentative but admiring.
  - (D) Balanced and analytical.
  - (E) Ironic and contentious.
8. The content of the passage can best be used to support the argument for:
- (A) Giving up the practice of using charcoal to produce solar energy.

- (B) Using unconventional methods to replace fossil fuels.
  - (C) Further research for developing more efficient photovoltaic cells.
  - (D) Using solar energy as a supporting power system.
  - (E) Finding ways to produce significant quantities of hydrogen by using photovoltaic cells.
9. In the first paragraph of the passage, the expression 'available for utilization by the masses' has been used by the author to emphasize:
- (A) The collection of a lot of data and information for the purpose of conducting extensive research.
  - (B) The need to think of cheaper ways of providing solar energy generated electricity, ready to be consumed by the common man.
  - (C) The need to use solar energy related technology for the purpose of domestic consumption.
  - (D) The importance of investing in research to produce cheaper versions of existing powered batteries and equipment.
  - (E) Proposing an innovative approach to the use of technology that is cheap and does not cause pollution.
- ☞ The right answer is the one that can be deduced based on facts or opinions stated in the passage.

#### Passage – 4

**Read the passage and answer the questions that follow by choosing one option, unless stated otherwise.**

A flow cytometry works like a microscope but with greater precision and accuracy. It is useful in examining and calculating the quantity of particles such as cells and chromosomes. The process requires the microscopic particles to be *suspended* in a stream of fluid and then passed through an electron detection apparatus. The process of collecting data from sample using the flow cytometer is termed 'Acquisition'. Acquisition is mediated by a computer physically connected to the flow cytometer, and the software which handles the digital interface of the cytometer.

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The software is capable of adjusting parameters (i.e., voltage, compensation, etc.) for the samples being tested, and also assists in displaying initial sample information while acquiring sample data to ensure that parameters are set correctly. The technique is very useful in diagnosing health disorders especially blood cancer.

☞ In inference questions, a rephrased version of a statement in the passage is NOT the right answer.

10. According to the passage, ‘*suspended*’ means:
- (A) Stopping or staying something.
  - (B) Hanging by attachment.
  - (C) Refraining from forming of something.
  - (D) Keeping from falling.
  - (E) Keeping something afloat.

## Exercise No. 2

**Directions:** Read the passage and answer the questions that follow by choosing one option, unless stated otherwise.

### Passage – 1

The saga of Harriet Tubman epitomizes extraordinary courage. Despite being plagued by several problems, her spirit remained indomitable and her iron-will ensured her freedom as well as that of other slaves. She had seen just about every misery: Being born in a slave family, growing up as a teenager who suffered from seizures and blackouts caused by a head injury—a problem from which she never recovered fully, and later on marrying a man who threatened to expose her dangerous designs to be free.

What will particularly captivate the imagination of readers is her exemplary organizational skills, which ensured that neither she nor any of the fugitives she guided were ever caught. She planned the escapes of several slaves by using complex and extensive networks (nicknamed Underground Railroad) that have rarely been understood. She was fondly referred to as Moses for leading many out of slavery. Besides this, the dual streak in her personality makes interesting reading. On one hand, she was deeply religious and on the other, possessed a gun that she did not mind using, if a slave on a runaway errand dithered. The gun also had another use: Provide protection from slave catchers and their dogs.

Also read the sentences that precede and follow.

- 1 The passage provides information about all of the following aspects pertaining to Harriett Tubman EXCEPT
  - (A) Did she suffer from seizures and blackouts throughout her life?
  - (B) How many slaves were caught while they were being led to freedom by her?
  - (C) Did she understand the intricacies of Underground Railroad networks?
  - (D) Did her spouse share her vision of being free?
  - (E) What was the self-defense mechanism she adopted while trying to escape?
2. Based on what is stated or can be inferred from the passage, answer the question that follows by choosing one, two or all the three options that follow the question.
 

The passage suggests that Harriett Tubman:

  - (A) Faced several hardships during her life time.
  - (B) Was a popular legend due to her audacious acts.
  - (C) Was a controversial person as she owned a gun.
3. Choose the sentence in the passage that explains the odds that Harriett Tubman faced.

☞ While looking for the answer to a specific detail question, do not limit your focus to only one

**Passage – 2**

Read the passage and answer the questions that follow by choosing one option, unless stated otherwise.

The failure of the potato crop in Ireland during the mid 1840s was one of the factors which instigated the outbreak of a famine that led to far-reaching consequences. This Great Famine devastated the country for many years and marked the beginning of the steep depopulation of Ireland in the 19th century.

Potato was the crop of choice and also the main diet of the Irish because of its high nutritional value and because it produced a large yield even in a small area. Peasants of Ireland were contented in growing a large proportion of potato as a single acre of the potato crop could support a whole family for almost a year. Thus, the potato crop was everything, it was both food and cash to the Irish.

Nonetheless, complete dependence on this crop had its own effects. Potatoes could not be stored for a long period. The farmers, who were accustomed to growing only one crop, neglected growing other crops as a hedge against possible failures.

The Great Famine had imperiled the lives of the Irish. Starvation and disease gripped the country and killed thousands of people. By 1850 the population plummeted from over eight million to less than six million. One million people died of disease and starvation, and one million left Ireland for Britain, Europe, or North America.

However, one of the far-reaching results of the Great Famine was that farming in Ireland changed from one-crop economy to an agricultural economy that included livestock and other crops such as grains.

☞ The phrase ‘according to the passage’ indicates that the information required to answer the question is explicitly mentioned in the passage.

4. According to the passage, one of the profound effects of the Great Famine was:
- (A) Non-reliance on potatoes for subsistence.  
 (B) Rapid increase in the number of emigrants to other countries.

- (C) Diversification in terms of agricultural produce grown.  
 (D) The outbreak of communicable diseases.  
 (E) Implementation of innovative agricultural practices.

5. The main purpose of the passage is to:
- (A) Discuss the reasons for the failure of the potato crop in Ireland during the mid 1840s.  
 (B) Explain how dependence on a single-crop led to a major crisis which brought about significant changes in Ireland in the 19th century.  
 (C) Explain why the Irish peasants preferred to rely on potatoes for their diet.  
 (D) Elucidate how the potato-crop failure jeopardized the ability of Irish peasants to fend for themselves and their families.  
 (E) Point out how the Great Famine led to the transformation of Ireland from a single-crop economy to an agricultural economy.
6. The passage supplies information for answering all the following questions EXCEPT:
- (A) How were the people of Ireland affected by the Great Famine?  
 (B) Why was the potato the main diet of the Irish people?  
 (C) Why were the Irish peasants not inclined to grow other crops?  
 (D) Why did many people from Ireland immigrate to other countries?  
 (E) Why could potatoes not be stored for a long period?
- ☞ Read the questions carefully to understand what is expected of you.

**Passage – 3**

Read the passage and answer the questions that follow by choosing one option, unless stated otherwise.

Unlike other professionals, defense personnel are trained to kill the adversary in the name of nation and patriotism. Hence, a soldier is expected to be ruthless and without any emotions, but these traits are not

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inherently present in most women. Women, in order to succeed in this profession therefore require physical and mental fortitude. Probably for this reason most of the nations have less number of women on their defense rolls.

Although women are recruited in armed forces as combat aircraft pilots and are assigned prolonged combat duties on, naval ships, closely spaced with men, they are marginalized from decision making processes. So, many skeptics consider this as a political gimmick to flaunt the country's gender equality.

Social, behavioral and psychological problems are the battles that women, have to fight at all levels. Many surveys prove that most women military officers are not satisfied with the ethos of their profession. One of the major concerns that defies solution is how to ensure safety and protect the dignity of women in the forces as their sexual harassment is startling. The attitude of many military officials who dismiss complaints as silly and consider this as 'oversensitivity', is what bothers most women. Many officers adopt 'boys will be boys' attitude and don't take action against the offenders.

The competence of women is not given due recognition; therefore, they have to work harder than men to prove their mettle.

☞ For inference questions, decide what explicit information from the passage needs to be used in order to make the inference. Read the explicit information in the passage carefully. Keep in mind the main purpose of the passage.

7. The author of the passage is chiefly concerned with:
- (A) Criticizing the military officials for their attitude towards women in the armed forces.
  - (B) Expressing disinclination towards the idea of women joining the armed forces.
  - (C) Discussing the adverse situations being confronted by women in the armed forces.
  - (D) Pointing out the indifference of the military officials towards the problems of women in the armed forces.
  - (E) Strongly condemning the gender discrimination in the armed forces.

#### Passage – 4

Read the passage and answer the questions that follow by choosing one option, unless stated otherwise.

Demonstration and comprehension of a language are the two functions for which some elements of the brain have matured over a period of time, according to Howard Gardner, Noam Chomsky and others who subscribe to this idea. Darwinian Theory is the base for this school of thought, referred to as the nature school; on the other hand, the nurture school of thought believes that humans do not possess inherited linguistic faculty and that it was a consequence of learning and cultural evolution.

Another controversy that revolves around this debate is that the advocates of the nature school of thought believe that the language skill is an unconnected ability while nurture proponents believe that it exists along with the other perceptive abilities. Both the schools of thought agree that there is some biological difference in the components of the brain of humans that differentiates men from animals, while the extent of difference and the role of genetics are still debated.

Careful examination of the debate reveals that the proponents of both the theories agree on all the basic concepts but disagree on the specific argument that actually synthesizes the debate. Proponents like Gardner and Chomsky believe that infants have the innate ability to acquire language, while nurture proponents like Clark, Skinner, and Piaget believe that this ability is actually nurtured and developed by the environment. To support their rationale, they mention that with proper training even rats and pigeons can perform seemingly complex tasks.

The nature proponents argue that if a human and a chimpanzee are nurtured under similar environmental conditions, then the human behavior will still be profoundly different from that of the animal. They further assert that this is possible only because of genetic differences. On the other hand, if two genetically identical twins are brought up under different environmental conditions, their behavioral difference will be significant and this is due to nurturing, claim the nurture proponents.

- ☞ Reading habit will improve vocabulary and this will reduce regression in reading.
8. Which of the following titles best summarizes the content of the passage?
- (A) Darwinian Theory vs Nature School of Thought.  
 (B) Genetics vs Evolution.  
 (C) Nature vs Nurture.  
 (D) Gardner vs Chomsky.  
 (E) Linguistics vs Behaviorists.
9. What is the one basic tenet that the proponents of both the schools do not agree on?
- (A) Language acquisition is innate in human beings.  
 (B) Biological components of human brain are different from animals.  
 (C) Language is an autonomous ability of humans.  
 (D) Animals can learn human language if proper conditions are provided.  
 (E) Darwinian theory is the base for nurture school of thought.
10. According to the passage, the phrase ‘inherited linguistic faculty’ means
- (A) Acquired information.  
 (B) An aptitude.  
 (C) Ideas learnt from ancestors.  
 (D) A nurtured trait.  
 (E) An imitation.
- ☞ Locate words such as barely, scarcely, hardly, almost, all, none as such words indicate a contrast meaning.

### Exercise No. 3

#### Passage – 1

Read the passage and answer the questions that follow by choosing one option, unless stated otherwise.

Dr Robert H. Goddard, at one time a physics professor at Clark University, Worcester, Massachusetts, was largely responsible for the sudden interest in rockets back in the twenties. When Dr Goddard first started his experiments with rockets, no related technical information was available. He started a new science, and field of engineering. Through his scientific experiments, he pointed the way to the development of rockets as we know them today. The Smithsonian Institute agreed to finance his experiments in 1920. From these experiments, he wrote a paper titled ‘A Method of Reaching Extreme Altitudes,’ in which he outlined a space rocket of the step (multistage) principle, theoretically capable of reaching the moon.

Goddard discovered that with a properly shaped, smooth, tapered nozzle, he could increase the ejection velocity eight times with the same weight of fuel. This would not only drive a rocket eight times faster, but sixty-four times farther, according to his theory. Early in his experiments he found that solid-fuel rockets

would not give him the high power or the duration of power needed for a dependable supersonic motor capable of extreme altitudes. On March 16, 1926 after many trials, Dr Goddard successfully fired, for the first time in history, a liquid-fuel rocket into the air. It attained an altitude of 184 feet and a speed of 60 mph. This seems small as compared to present-day speeds and heights of missile flights, but instead of trying to achieve speed or altitude at this time, Dr Goddard was trying to develop a dependable rocket motor.

Dr Goddard later was the first to fire a rocket that reached a speed faster than the speed of sound. He was the first to develop a gyroscopic steering apparatus for rockets. He was the first to use vanes in the jet stream for rocket stabilization during the initial phase of a rocket flight. And he was the first to patent the idea of step rockets. After proving on paper and in actual tests that a rocket can travel in a vacuum, he developed the mathematical theory of rocket propulsion and rocket flight, including basic designs for long-range rockets. All of this information was available to our military men before World War II, but evidently, its immediate use did not seem applicable. Near the end of

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World War II, we started intense work on rocket-powered guided missiles, using the experiments and developments of Dr Goddard and the American Rocket Society.

☞ Questions on understanding ‘Implicit meaning’ are of two types (1) where an inference has to be made and (2) where ideas from one context have to be applied to another.

- Which of the following questions does the passage answer the best?
  - How did Dr Goddard become interested in rocket science?
  - How did Dr Goddard develop the new field of rocket science?
  - How is a multistage rocket capable of reaching the moon?
  - Why is liquid fuel more dependable than solid fuel?
  - How did the American Rocket Society get its start?
- One can assume from the article that:
  - All factors being equal, the proper shape of the rocket nozzle would increase the ejection velocity and travel distance.
  - Solid-fuel rockets would give higher power and duration.
  - A blunt nozzle would negatively affect speed and distance.
  - Supersonic motors are needed for extreme altitude.
  - The first successfully fired liquid-fueled rocket was for developing a dependable rocket motor.
- The first step in Dr Goddard’s development of a feasible rocket was
  - The mathematical theory of rocket propulsion and rocket flight.
  - The development of liquid-rocket fuel.
  - The development and use of vanes for rocket stabilizing.

- The development of the gyroscope.
- His thesis for multistage rocket design.

☞ Usually an inference has to be drawn after synthesizing two or more statements in the passage.

## Passage – 2

**Read the passage and answer the questions that follow by choosing one option, unless stated otherwise.**

Three traditions of thought dominate the ethics of war and peace: *Realism*; *Pacifism*; and *Just War Theory* (and, through just war theory, International Law). Perhaps there are other possible perspectives but it seems that very few theories on the ethics of war succeed in resisting ultimate classification into one of these traditions. They are clearly hegemonic in this regard.

Before discussing the central elements of each tradition, let’s declare the basic conceptual differences between ‘the big three’ perspectives. The core, and controversial, proposition of just war theory is that, sometimes, states can have moral justification for resorting to armed force. War is sometimes, but of course not all the time, morally right. The idea here is not that the war in question is merely politically shrewd, or prudent, or bold and daring, but fully moral, just. It is an ethically appropriate use of mass political violence. World War II, on the Allied side, is always trotted out as the definitive example of a just and good war. Realism, by contrast, sports a profound skepticism about the application of moral concepts, such as justice, to the key problems of foreign policy. Power and national security, realists claim, motivate states during wartime and thus moral appeals are strictly wishful thinking. Talk of the morality of warfare is pure bunk: Ethics has got nothing to do with the rough-and-tumble world of global politics, where only the strong and cunning survive. A country should tend to its vital interests in security, influence over others, and economic growth—and not to moral ideals. Pacifism does not share realism’s moral skepticism. For the pacifist, moral concepts can indeed

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be applied fruitfully to international affairs. It *does* make sense to ask whether a war is just: That is an important and meaningful issue. But the result of such normative application, in the case of war, is always that war should not be undertaken. Where just war theory is *sometimes* permissive with regard to war, pacifism is *always* prohibitive. For the pacifist, war is always wrong; there's always some better resolution to the problem than fighting.

☞ Sometimes, it is possible to deduce a conclusion from even a single statement.

4. 'They are clearly hegemonic in this regard'. 'Hegemonic' stands for
- (A) Paramount.                      (D) Illusory.  
 (B) Trivial.                          (E) Reactionary.  
 (C) Peripheral.
5. 'Realism' believes all of the following EXCEPT:
- (A) The claim that nations wage a war because they have a moral incentive.  
 (B) A nation should cater to its prerequisites instead of aiming to uphold ethical paradigms.  
 (C) There is no sense in co-relating armed conflict to probity.  
 (D) It is doubtful that disputes on international relations can be solved using ethical parameters.  
 (E) At any given time, a nation cannot justify war as the last resort to find a solution for international problems.

### Passage – 3

Read the passage and answer the questions that follow by choosing one option, unless stated otherwise.

Bureaucracy is a body of officials organized on the basis of abstract legal rules. The officials are appointed on permanent basis. Hence, they are termed as career officials. Their educational qualifications, professional skills and experience determine their

position in the organizational hierarchy. A performance appraisal is regularly done, which acts as one of the criteria for promotion in the bureaucratic setup. However, there are organizations which consider seniority as the main criteria for promotion of officials. Bureaucratic organizations are preponderant in the large scale societies, with the development of economic and political activities. So, many formal rules emerge to regulate these activities.

☞ Some questions require you to locate specific information explicitly mentioned in the passage.

6. According to the passage, which of the following is not related to bureaucracy?
- (A) Laws.                              (D) Flexibility.  
 (B) Qualifications.                  (E) Promotion.  
 (C) Hierarchy.
7. Which of the following can be inferred from the passage?
- (A) Educational qualification is required for bureaucrats.  
 (B) The work of bureaucrats is evaluated.  
 (C) Part-time appointments do not exist in bureaucracies.  
 (D) The position of a bureaucrat in the organization depends only on educational qualifications.  
 (E) A man who has not studied law cannot be a bureaucrat.

### Passage – 4

Read the passage and answer the questions that follow by choosing one option, unless stated otherwise.

One of the reasons for global warming is climate change that occurred during interglacial periods. A Canadian geologist thought that global warming can be dated back to some 10,000 years and the vast ice sheet of three kilometers that covered most of the USA and Canada has melted and the great lake

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gauged under the ice sheet crisscrossed and flowed as the Hudson River. The present market driven forces working for socio-economic goals take science and technology in their stride and are ushering the disastrous effects through green house gases, an absolute abuse of the earth. The effects of global warming are unfathomable. The Kyoto Protocol promised a lot but has not achieved much. It requires the developed countries to cut down carbon emissions by 5% and to enhance the positive initiative taken to cap their carbon emissions. A commendable step, though a tiny one, taken by the Americans is to ‘unplug’ all their electrical gadgets for one hour on March 29, 2008 to cut down carbon emission.

☞ Develop the ability to locate the basic conceptual word around which the author’s opinion moves.

Before evaluating a particular answer choice, think of a single statement or a title that can describe the purpose of the passage or paragraph.

8. One of the following is not a method used by the author in the passage to exemplify the problem on hand.
- (A) Inclusion of concrete examples.  
 (B) Classification and discussion.  
 (C) Using supporting statements.  
 (D) Observation and hypotheses.  
 (E) Cause and effect.
9. According to the passage, Kyoto protocol:
- (A) Is an absolute failure.  
 (B) Only achieved what was promised.  
 (C) Achieved a little of what it promised.  
 (D) Was made to help developed countries.  
 (E) Was not enough to protect the damage.
10. Click a word from the passage which conveys the meaning that:
- (A) Commercialization of science has its own disadvantages.  
 (B) Promises are aloft but are hardly implemented.  
 (C) It is impossible to measure the damage caused.

### Exercise No. 4

#### Passage – 1

Read the passage and answer the questions that follow by choosing one option, unless stated otherwise.

*Aliens* is a 1986 science fiction action film directed by James Cameron and starring Sigourney Weaver, Carrie Henn, Michael Biehn, Lance Henriksen, William Hope, and Bill Paxton. A sequel to the 1979 film *Alien*, *Aliens* is set fifty-seven years after the first film with Weaver’s character Ellen Ripley returning to the planet LV-426 where she first encountered the hostile Alien. This time she is accompanied by a unit of Colonial Marines. *Aliens*’ action-adventure tone was in contrast to the horror motifs of the original *Alien*. Following the success of *The Terminator*, which helped establish Cameron as a major action director, 20th Century Fox made the *Greenlight Aliens* with a budget of approximately \$18 million. It was filmed

in England at Pinewood Studios, and at a decommissioned power plant. *Aliens* earned \$86 million in the United States box office during its 1986 theatrical release and \$131 million internationally. The movie was nominated for seven Academy Awards, including a Best Actress nomination for Sigourney Weaver. It won in the categories of Sound Effects, Editing and Visual Effects.

☞ In questions based on ‘explicitly stated information’, first quickly find all the places in the passage where the specific topic of the question you are looking for is discussed.

1. ‘Aliens’ the 1986 science fiction is a sequel to the 1979 film. This suggests that:
- (A) The film was not original.  
 (B) It was released again.

- (C) The movie was a remake.  
 (D) It was based on the earlier theme.  
 (E) The film had great sequences.
2. The lead role was played by
- (A) Cameron. (D) Carrie Henn.  
 (B) Sigourney Weaver. (E) Michael Biehn.  
 (C) Aliens.

### Passage – 2

Read the passage and answer the questions that follow by choosing one option, unless stated otherwise.

Radioactive waste is a waste product containing radioactive material. It is usually the product of a nuclear process such as nuclear fission, though industries not directly connected to the nuclear power industry may also produce radioactive waste.

Radioactivity diminishes over time, so in principle, the waste needs to be isolated for a period of time until it no longer poses a hazard. This can mean hours to years for some common medical or industrial radioactive wastes, or thousands of years for high-level wastes from nuclear power plants and nuclear weapons reprocessing.

The majority of radioactive waste is ‘low-level waste’, which means it has low levels of radioactivity per mass or volume.

The main approaches to managing radioactive waste, to date, have been segregation and storage for short-lived wastes, near-surface disposal for low and some intermediate level wastes, and deep burial or transmutation for the long-lived, high-level wastes.

A summary of the amounts of radioactive wastes and management approaches for most developed countries are presented and reviewed periodically, as part of the IAEA Joint Convention on Safety of Spent Fuel Management and the Safety of Radioactive Waste Management. Radioactive waste typically comprises a number of radioisotopes: unstable configurations of elements that decay, emitting ionizing radiation which can be harmful to humans and the environment. These isotopes emit different types and

levels of radiation, which last for different periods of time. The radioactivity of all nuclear waste diminishes with time. All radio isotopes contained in the waste have a half-life period—the time it takes for any radionuclide to lose half of its radioactivity—and eventually all radioactive waste decays into non-radioactive elements.

The faster a radioisotope decays, the more radioactive it is. The energy and the type of the ionizing radiation emitted by a pure radioactive substance are important factors in deciding how dangerous it is. The chemical properties of the radioactive element will determine how mobile the substance is and how likely it is to spread into the environment and contaminates humans. This is further complicated by the fact that many radioisotopes do not decay immediately to a stable state but rather to a radioactive decay product leading to decay chains.

- ☞ In questions based on explicitly stated information, list the facts that are provided about the topic in question.

Decide how individual sentences or paragraphs are related and think what overall purpose these sentences or paragraphs serve.

**Directions for Q. No. 3: Consider each of the choices separately and select all that apply.**

3. Which of the following will enable us to decide how dangerous the radioactive substance is?
- (A) Complete and effective isolation of the radioactive substance.  
 (B) Time taken by a radioisotope to decay.  
 (C) The type of ionizing radiation emitted.
- ☞ In questions based on ‘Explicitly stated information’, the best answer will usually be a close paraphrase of the actual words used in the passage.
4. According to the passage, all of the following are not true EXCEPT:
- (A) If certain chemical properties of a radioactive element are controlled, humans will not be contaminated.

- (B) Segregation of the radioactive substance may not always produce the desired results.
- (C) Advanced countries, in their quest for development, seldom focus on radioactive waste management.
- (D) Damage caused by radioactive substances becomes considerably less with passing time.
- (E) Most of the radioactive waste material is hazardous.

☞ In case of longer passages, when answering questions on main purpose, it is better to understand the function of each paragraph rather than individual sentences.

5. The intention of the passage is to:

- (A) Offer safety measures while using radioactive isotopes.
- (B) Warn the developed countries about nuclear hazards.
- (C) Provide information about radioactive waste management.
- (D) Offer theoretical notes on radioactive substances.
- (E) Suggest ways of disposing nuclear waste.

### Passage – 3

**Read the passage and answer the questions that follow by choosing one option, unless stated otherwise.**

The Agora of Athens was the center of the ancient city: A large, open square where the citizens could assemble for a wide variety of purposes. On any given day, the space might be used as a market, or for an election, a dramatic performance, a religious procession, military drill, or athletic competition. Here administrative, political, judicial, commercial, social, cultural, and religious activities all found a place together in the heart of Athens, and the square was surrounded by the public buildings necessary to run the Athenian government. Given the prominence of Athens throughout much of antiquity, the Agora provides one of the richest sources for our understanding of the Greek world in antiquity. It is during

this ‘Classical’ period that the Agora and its buildings were frequented by statesmen such as Themistokles, Perikles, and Demosthenes, by the poets Aeschylus, Sophokles, Euripides, and Aristophanes, by the writers Thucydides and Herodotus, by artists such as Pheidias and Polygnotos, and by philosophers such as Sokrates, Plato, and Aristotle. Together, they were responsible for creating a society and culture that has set a standard against which subsequent human achievements have been judged. The Agora was the focal point of their varied activities and here the concept of democracy was first developed and practiced.

With the rise of Macedon under Philip II and Alexander the Great and during the subsequent Hellenistic period, all significant military, economic, and political power shifted to the East. In the spheres of education and philosophy, however, Athens maintained her preeminence. The Academy, founded by Plato, and the Lyceum, founded by Aristotle, continued to flourish. They were supplemented by the arrival of Zeno of Kition, who chose to lecture at the Agora in the Painted Stoa.

Athenian cultural dominance continued throughout the Roman period, and the buildings added to the Agora reflect the educational role of the city, a role that ended only with the closing of the pagan philosophical schools by the Christian emperor Justinian in A.D. 529. With the collapse of security in the empire, Athens and the Agora suffered from periodic invasions and destructions: the Herulians in the 3rd century, the Visigoths in the 4th, the Vandals in the 5th, and the Slavs in the 6th. Following the Slavic invasion, the area of the Agora was largely abandoned and neglected for close to 300 years.

☞ In questions on primary purpose, you have to understand the broad implications of a particular passage or particular paragraphs therein.

As a thumb rule, you need to scan the smaller passage and skim the bigger one.



6. All of the following statements are FALSE except:
- (A) To understand the rich splendor of the Greek classical times, the Agora is the only reliable source available.
  - (B) During the Hellenistic period, the Agora lost its prominence in the realm of pedagogy and metaphysics.
  - (C) For almost 300 years, the Agora was largely abandoned by pagan schools of doctrine and philosophers.
  - (D) It is in the Agora that great souls envisaged the concept of representative government.
  - (E) Christian Emperor Justinian's religious policy proved to be detrimental to security of the center of the ancient city, the Agora.
- ☞ Questions on primary purpose require an understanding beyond what is contained in the passage.
7. Consider each of the choices separately and select all that apply. The Agora of Athens:
- (A) Remained the citadel of culture until the Roman period.
  - (B) And its premises were patronized by scholars even before the arrival of Zeno of Kition.
  - (C) Was neglected by the citizens as all power shifted to the east.

#### Passage – 4

Read the passage and answer the questions that follow by choosing one option, unless stated otherwise.

The life and history of Aesop is involved, like that of Homer, the most famous of Greek poets, in much obscurity. Sardis, the capital of Lydia; Samos, a Greek island; Mesembria, an ancient colony in Thrace; and Cotiaem, the chief city of a province of Phrygia, contend for the distinction of being the birthplace of Aesop. Although the honor thus claimed cannot be definitely assigned to any one of these places, yet there are a few incidents now generally accepted by scholars as established facts, relating to the birth, life, and death of Aesop. He is, by an almost universal consent, allowed to have been born

about the year 620 B.C., and to have been by birth a slave. He was owned by two masters in succession, both inhabitants of Samos, Xanthus and Jadmon, the latter of whom gave him his liberty as a reward for his learning and wit. One of the privileges of a freed man in the ancient republics of Greece, was the permission to take an active interest in public affairs; and Aesop, like the philosophers Phaedo, Menippus, and Epictetus, in later times, raised himself from the indignity of a servile condition to a position of high renown. In his desire alike to instruct and to be instructed, he travelled through many countries, and among others came to Sardis, the capital of the famous king of Lydia, the great patron, in that day, of learning and of learned men. He met at the court of Croesus with Solon, Thales, and other sages, and is related so to have pleased his royal master, by the part he took in the conversations held with these philosophers, that he applied to him an expression which has since passed into a proverb, 'The Phrygian has spoken better than all.'

- ☞ You will come across some small passages and a few bigger ones.
8. As per the passage, all of the following are true EXCEPT:
- (A) Slaves had no interest in public life until they attained freedom.
  - (B) Slaves were endowed with cognitive abilities and sense of humor.
  - (C) Dual ownership of slaves was not unusual or uncommon.
  - (D) Though slaves faced opprobrium, they were capable of achieving eminence.
  - (E) Irrespective of the class one belonged to, Greeks appreciated erudition.
- ☞ In order to determine the primary purpose, one must understand how the various pieces of information presented in the passage function together to serve an overall purpose.
9. Consider each of the following and choose all that apply. 'The Phrygian has spoken better than all' is a proverb. It shows:

- (A) Phrygians valued freedom of speech as paramount.
- (B) Phrygians were good articulators.
- (C) Phrygians set the world standard for good rep-  
artee.
10. Which of the following conclusions can be drawn from the passage?
- (A) The narrator acknowledges Aesop to be famous.
- (B) The narrator questions the facts about Aesop's life.
- (C) The narrator confirms that Aesop was not a taciturn.
- (D) The narrator accepts Aesop's slavery as a challenge.
- (E) The narrator struggles to portray that slaves like Aesop are talented.

### Exercise No. 5

#### Passage – 1

Read the passage and answer the questions that follow by choosing one option, unless stated otherwise.

Constructivism, a theory of knowledge which has been formalized by Jean Piaget, describes the process of learning. It is a theory of learning which is often associated with pedagogic approaches that promote active learning. Jean Piaget has articulated the mechanisms by which knowledge is internalized by learners. He suggested that through the processes of accommodation and assimilation, individuals build up new knowledge from their experiences. During the process of assimilation, new experiences are built into the individual's pre-existing mental framework without disturbing the framework. This process of assimilation may happen not only when individuals' perceptions of the ways of the world are in conformity with their experiences but also when there is a discrepancy between individuals' mental impressions and their experiences. On the contrary, when individuals' experiences and their internal representations do not match, they may change their perceptions of the experiences to fit their mental framework. According to this theory, accommodation is the process of changing one's interpretations of the world to fit the new experiences. When the world does not function the way we expect, we often fail, but by accommodating the new experiences and changing from our impressions about the ways of the world, we learn from our failure, or others' failure.

Smart readers anticipate the author and predict future ideas.

**Directions for Q. No. 1:** Consider each of the choices separately and select all that apply.

- According to the passage, the theory of constructivism suggests that:
  - Humans acquire their understanding based on the knowledge they receive from any external source.
  - Learning does not happen when there is a mismatch between an individual's experiences and his ideas.
  - Humans generate knowledge from an interaction between their experiences and their ideas.

**Directions for Q. No. 2 & 3:** Choose one option as the answer from the five choices given.

- Which of the following situations exemplifies a constructivist learning environment?
  - A mathematics class in which the learners are given a set of problems to solve after they are taught the basics.
  - Students learning a metallurgical procedure with the help of a chart.
  - A literature class where the students are listening to a lecture and making notes.
  - A Political Science class where the learners perform a role play to demonstrate how the Parliament functions.
  - A grammar class where the learners are made to cram the rules.

3. The passage provides an answer to which of the following questions?
- (A) What is learning?
  - (B) When does learning happen?
  - (C) How does learning happen?
  - (D) How does the world operate?
  - (E) What leads to effective learning?
- ☞ Good comprehenders tend to have good vocabulary.

### Passage – 2

Read the passage and answer the questions that follow by choosing one option, unless stated otherwise.

The human brain, which has evolved through generations, is thought to possess an incredible capacity to think. But, the findings of a research conducted on mice proved that manipulation of a certain gene resulted in a remarkable increase in brainpower with no detrimental effects. The human brain also possesses this gene which is actively involved in making humans stupid. When a study was conducted on a section of the hippocampus called CA2, which is found in both humans and mice, the findings revealed that although the hippocampus plays an important role in long-term memory; the neurons in CA2 did not take part in the cellular process on which memory and learning depend. The researchers noticed that the neurons in CA2 were filled with RGS14, a signaling protein which inhibits long-term potentiation (long-lasting increase in the strength of nerve impulses). When the mice lacking this gene coded RGS14 were bred, it was found that the neurons in CA2 demonstrated long-term potentiation. Disabling the gene has affected not just the functioning of the various organs of mice but also the functioning of their brains. The results of tests conducted on normal mice and the knockout mice, the mice which lacked RGS14, proved that the altered mice performed better on memory tests than the normal mice. The knockout mice also exhibited better spatial navigation skills than the normal

mice. The scientists noticed no negative effects by removing the RGS14 gene. The scientists are hopeful that the RGS14 gene and protein have a promising therapeutic potential in store for those suffering from Alzheimer's.

- ☞ It helps to know the structure of the passage; often the introductory sentence will give an overview of the passage.
4. Consider each of the choices separately and select all that apply. According to the passage, crippling the 'dumb' gene in mice:
- (A) Prevented the neurons in CA2 from participating in the various biological processes.
  - (B) Boosted their physical and cognitive abilities.
  - (C) Debilitated the neurons in the hippocampus of the brain.
5. The passage can best be described as:
- (A) A description of a biological process.
  - (B) The summary of a recent scientific research.
  - (C) The evaluation of a survey conducted.
  - (D) A critical analysis of a scientific study.
  - (E) A review of a new scientific thesis.
6. The passage provides information about:
- (A) Why there is a gene in human beings that makes them dumber?
  - (B) What could be the downside of removing the RGS14 gene?
  - (C) Why the neurons in CA2 do not participate in cellular functions?
  - (D) Which part of the brain is crucial to learning and memory?
  - (E) How isolating the gene helps the patients of Alzheimer's disease?
- ☞ Comprehension is the ability to understand the ideas and the relationship between ideas conveyed in the text.



**Passage – 3**

Read the passage and answer the questions that follow by choosing one option, unless stated otherwise.

A financial policy which promotes the idea that excessive spending should be avoided by governments can be called ‘fiscal conservatism’. It is often noticed that fiscal conservatives are worried about the overall expenditure by the government and the debts incurred in the process. Fiscal conservatives attach great importance to balancing the budget efficiently. International trade left to its natural course without tariffs or other restrictions, economy which is not regulated, not imposing heavy taxes, and other such conservative policies are often associated with fiscal conservatism. Believers of this policy are not averse to increasing taxes and adopting stringent methods to reduce spending. However, libertarians have a different point of view. They want to ‘starve the beast [STB]’ by cutting taxes for the purpose of decreasing tax revenue. According to them, it will reduce government spending. STB became a substitute for serious budget control efforts, reduced the political cost of deficits, encouraged fiscally irresponsible tax cutting and ultimately made both spending and deficits larger. American businessman, politician, and Mayor of New York City, Michael Bloomberg, considers himself a fiscal conservative and expressed his definition of the term at the 2007 United Kingdom Conservative Party Conference. ‘To me, fiscal conservatism means balancing budgets—not running deficits that the next generation can’t afford. It means improving the efficiency of delivering services by finding innovative ways to do more with less. It means cutting taxes when possible and prudent to do so, raising them overall only when necessary to balance the budget, and only in combination with spending cuts. It means when you run a surplus, you save it; you don’t squander it. And most importantly, being a fiscal conservative means preparing for the inevitable economic downturns - and by all indications, we’ve got one coming.’

☞ Good readers are aware why they are reading a text.

7. A fiscal conservative will react positively to all of the following EXCEPT:
  - (A) The announcement that all free trade restrictions have been revised.
  - (B) The budget deficit of the country for the current year records an all time low.
  - (C) The existing resources are utilized efficiently to strike a balance in the budget.
  - (D) A proposal which increases taxes so as to meet the capital expenditure.
  - (E) A decision to complete all the huge pending projects.
8. The mayor of New York city who considers himself a fiscal conservative believes that:
  - (A) Increasing taxes and restricting expenditure is important while trying to balance the budget.
  - (B) Debts incurred by the present government should not deter the next generation.
  - (C) ‘Starve the beast’ by cutting taxes is an axiom to be appreciated.
  - (D) A country must have the ingenuity to convert a disadvantage to an advantage.
  - (E) Spending in the present for a bright future is not a bad idea.

☞ Good readers can associate ideas given in the text more quickly.
9. The view ‘Starve the beast’ encourages:
  - (A) Cutting taxes and increasing expenditure.
  - (B) Increasing taxes and reducing expenditure.
  - (C) Increasing both deficit and expenditure.
  - (D) Reducing both future investments and present expenditure.
  - (E) Spending cautiously to circumvent economic downturn.

**Passage – 4**

Read the passage and answer the questions that follow by choosing one option, unless stated otherwise.

A significant proportion of life on Earth is found in the world’s oceans. To a great extent, the marine life helps decide the nature of our planet. Marine creatures

(Continued)

make a significant contribution to the oxygen and carbon cycles and also regulate the Earth's climate. An area of science which deals with the study of these marine organisms and their ecological relationships is called marine biology. On the basis of their mode of life the marine organisms are categorized into nektonic, planktonic, and benthic. Those organisms which can swim and move freely in water are called nektonic animals and the ones which have little or no power of locomotion are called planktonic organisms. These are microscopic organisms and float in water. The benthic organisms live at the bottom of the sea and they creep or burrow. The sessile forms like the oysters, sponges and corals also are included in this category. Scientists are conducting intensive studies on these organisms to understand the usefulness of these creatures to humans and also to estimate the effects of human activity on marine life and environments.

☞ It is good to broaden your reading habits. Develop interest in world events by reading news papers, magazines and books.

10. To which of the following questions does the passage provide an answer?
- (A) How does marine life affect the Earth's environment?
  - (B) What is the impact of human activity on marine life?
  - (C) How does marine life determine the nature of our planet?
  - (D) How are the marine organisms useful to humans?
  - (E) What is the accurate proportion of life existing in the oceans?

# CHAPTER 9

## Practice Test

The practice test is important to assess your preparation. It will help you identify your strong areas and weak points. You can plan corrective measures accordingly. Keep the following points in mind before you take the practice test:

- You need 3 hours and 30 minutes to take the complete test.
- At the beginning of each section, time allotted is mentioned.
- Take the test under simulated conditions.
- The actual test is computer based but the practice test that follows requires you to mark the answers on paper.
- After completing the test, compare your answers with the key provided.
- Identify your mistakes and correct them.
- Pay attention to the time taken to complete each section.

### ***Analytical Writing***

#### ***Analyze an Issue***

**Duration: 30 minutes**

**Keep the following points in mind while attempting the issue task:**

- Read the instructions thoroughly before responding.
- Use good supporting examples and reasons.
- Map important points.
- Follow the conventions of standard English grammar.
- Proofread and edit your essay.

**Issue Topic**

**Public resistance to government is systematically weakened under democracy.**

State if you agree or disagree with the statement above. Explain your stand and support it with suitable reasons and examples.

**Analyze an Argument****Duration: 30 minutes**

**Keep the following points in mind while attempting the argument task:**

- A short argument will be presented.
- You are not required to give your opinion.
- You are required to evaluate the given argument.
- Identify the important elements conclusion, evidence and flaws in the given argument.

**Argument Topic**

**The following appeared in a newspaper daily:**

Women seem to have an edge over men in remembering events. A study recently conducted on 450 men and women between 40 and 60 years by scientists from Lackme University clearly showed that women have better memory than men. All the subjects were asked to recall dates of important events in their lives. It was noticed that the errors committed by women on this memory test were significantly lower than those made by men. Almost a 15 percent difference was noticed. Therefore it is not a wonder that your wife remembers your birthday every time while you are accused of forgetting it.

**Discuss with specific examples how the evidence given in the argument can be supported or weakened.**

**Section-1: Verbal Reasoning****Duration: 30 minutes****20 Questions**

**Directions:** *The passage given below is followed by a few questions. You have to answer the questions on the basis of what is directly stated or can be logically inferred from the given passage. Choose the option that best answers the question.*

One of the many subjects treated vituperatively by August Strindberg in his ‘*Addresses to the Swedish Nation*’, 1910, was the choice in 1901 of the first Nobel Laureate in literature, Sully Prudhomme. Strindberg goes on to state that the prize was awarded to Prudhomme ‘contrary to statutes and will’.

What Strindberg is referring to is the fact that Alfred Nobel had stipulated in his will in 1895 that the Nobel Prize for literature should be awarded to the person who had produced ‘the most outstanding work in an ideal direction’. As a contemporary of Nobel, Strindberg is most likely right when he points out that the adjective *idealistic* is something else than the adjective *ideal* and incompatible with the will. But he does not say what the difference is. The question of the meaning of the adjective *ideal* as used by Nobel—considered strange or even anomalous—has been discussed for almost a hundred years and many interpretations have been proposed. As

Kjell Espmark says in his book *The Nobel Prize in Literature: A Study of the Criteria behind the Choices*, 1991: ‘Indeed, the history of the literature prize is in some ways a series of attempts to interpret an imprecisely worded will.’

Nobel provided us with five criteria. Three of them are of a general type, valid for all the five prizes, and two are specifically designed for the literary prize. (1) ‘To those who ... shall have conferred the greatest benefit on mankind’. This is the basic criterion, introduced in the very first sentence of the relevant paragraph in the will. (2) ‘During the preceding year’. For obvious reasons, this is interpreted in such a way that the writer shall be alive at the moment of nomination—no room for Shakespeare—and the oeuvre shall be of current interest. (3) ‘No consideration whatever shall be given to the nationality of the candidates’. This was a far-sighted criterion, although not in keeping with the national romanticism of the late 19th century. In the last decade or so, it has been possible for it to apply extensively. (4) ‘To the person who shall have produced ... the most outstanding work’. It goes without saying that this means literary excellence. (5) ‘In an ideal direction’. In accordance with a philological analysis, including an investigation of an amendment in the handwritten will, this means ‘in a direction towards an ideal’, where the domain of the ideal is indicated by the first criterion above.

With the conservative permanent secretary Carl David af Wirsén setting the trend, the discussion in the academy during the first Nobel years led to an idealistic reading of the will in spite of balancing contributions from Esaias Tegnér and others. This was accomplished in the spirit of the Swedish philosopher Christopher Jacob Boström, the German aesthete Friedrich Theodor Vischer, advocating ideal realism, and with them, then, Wirsén. No doubt, this is what Strindberg had noticed and turned against.

The attitude of the academy is of course, reflected in the history of prize citations. Almost every third prize citation in the first three decades makes use of words like *idealistical(ly)* in one way or another.

Q.1. The author’s attitude towards the academy can best be described as:

- (A) Dispassionate
- (B) Pragmatic
- (C) Skeptical
- (D) Cautious
- (E) Condescending

Q.2. According to the passage, all of the following are true EXCEPT:

- (A) The Nobel Prize for literature was not awarded posthumously.
- (B) Alfred Nobel’s will was obscure, so annotation was different.
- (C) The Academy had to observe a stringent selection procedure.
- (D) The winner under any category had to meet certain qualifications.
- (E) Some writers had reservations about the choice of words in the will.

**Note: Question 3 is based on the following passage.**

Advertising is the promotion of a company’s products and services through different mediums to increase the sales of the product and services. It works by making the customer aware of the product and by focusing on customer’s need to buy the product. Globally, advertising has become an essential part of the corporate world. Therefore, companies allot a huge part of their revenues to the advertising budget. Advertising also serves to build a brand of the product which goes a long way to make effective sales.

Q.3. Which of the following, if true, would cast a serious doubt on the conclusion drawn above?

- (A) Successful companies create more jobs, pay more tax and contribute directly to economic growth.
- (B) Business sectors with the highest rates of investment in advertising are those where competition, a recognized driver of growth, is liveliest.

- (C) Countries where relatively little is invested in advertising are also those where economic growth is weakest.
- (D) Without advertising, many of the world's media as we know them would not exist.
- (E) Large corporations could not have grown to their present size without being able to find innovative ways to raise capital to finance expansion.

**Note:** *Question 4 is based on the following passage.*

Nowhere is the relationship between healthy ecosystems and healthy people more apparent than in the global water system. Clean water is the single most important building block of ecosystems around the world, say the Centers for Disease Control and Prevention. It's also our most valuable resource, the EPA (Environment Protection Agency) asserts. However, contamination of the world's waters leaves 2.5 billion people without access to sanitized water sources. Because global water conditions are declining, more people will soon have to rely on polluted water sources unless we make a concerted effort to clean our water supply.

Q.4. Which of the following, if true, provides the most support for the above argument?

- (A) Since its inception in 2007, the UNICEF Tap Project has raised nearly \$3 million in the U.S. and has helped provide clean water for millions of children globally.
- (B) The U.S. Environmental Protection Agency (EPA) targets enforcement at the most significant water pollution problems and will work to improve transparency and accountability by providing the public with access to better data on water quality in its communities.
- (C) Today, many people dump their garbage into streams, lakes, rivers, and seas, thus making water bodies the final resting place of cans, bottles, plastics, and other household products.
- (D) While pollution that has already occurred is a current threat to all life on Earth, attempts to clean it up may cause even more harm.
- (E) Water fluoridation stands as one of the most heinous crimes of our time, showing that people are poisoned every time they drink a glass of tap water.

**Directions for Q. No. 5 to 9:** *Fill in the blanks so that the text is complete. Select the best option for each numbered blank from the five options given.*

Q.5. It is difficult to come up with a standardized formula that can explain the bases of investment forecasting, if we (1) \_\_\_\_\_ the psychological prejudices of those people who practice the investment arts.

**Blank (1)**

- (A) Undermine
- (B) Ignore
- (C) Promote
- (D) Exploit
- (E) Unveil

Q.6. Sometimes previous experience may prove to be (1) \_\_\_\_\_ as it may result in an insular vision and may prevent one from exploring new avenues.

**Blank (1)**

- (A) Detrimental
- (B) Overwhelming
- (C) Paltry
- (D) Ubiquitous
- (E) Volatile

Q.7. A strong debate is (1) \_\_\_\_\_ regarding corporal punishment [CP] with some in favor of it claiming that a complete ban may be too strong a measure as it may (2) \_\_\_\_\_ loving parental jurisdiction. Those who voice their concerns against CP claim that it results in behavioral (3) \_\_\_\_\_ leaving a permanent scar on a child's psyche.

- | <b>Blank (1)</b>  | <b>Blank (2)</b> | <b>Blank (3)</b> |
|-------------------|------------------|------------------|
| (A) Still brewing | (D) Abjure       | (G) Impairment   |
| (B) In place      | (E) Vitiate      | (H) Solipsism    |
| (C) A dream       | (F) Hail         | (I) Adjustment   |

Q.8. The Development, Relief, and Education for Alien Minors Act [DREAM] when enacted, will address the problems of many immigrant settlers, feel the supporters of the bill, but the opponents claim that the bill will enable criminals to (1) \_\_\_\_\_ easily, although the clauses in the bill clearly state that the benefits of the bill will not reach those who have a criminal record.

- | <b>Blank (1)</b>    | <b>Blank (2)</b> |
|---------------------|------------------|
| (A) Get away        | (D) Rehabilitate |
| (B) Converge        | (E) Waffle       |
| (C) Seek employment |                  |

Q.9. The text of the long-term cooperative action (AWG-LCA), which has received consensus, is a (1) \_\_\_\_\_ document as it fails to view differently the problems of the developed and developing countries. The agreement is (2) \_\_\_\_\_ about climate change action as there is neither global emission reduction target (for the future) nor emission reduction targets for the developed countries. It is unfortunate that the agreement allows countries to decide (3) \_\_\_\_\_ what they want to do to reduce their emissions, which will mean that industrialized countries are not made accountable and this could lead to a free-for-all situation.

- | <b>Blank (1)</b>  | <b>Blank (2)</b> | <b>Blank (3)</b>        |
|-------------------|------------------|-------------------------|
| (A) Lackadaisical | (D) Critical     | (G) Forcibly            |
| (B) Reasonable    | (E) Creative     | (H) On their own accord |
| (C) Snide         | (F) Nebulous     | (I) Peculiarly          |

**Note:** Questions 10 to 12 are based on the following passage.

**Directions:** Answer the questions according to the given directions for each question.

The crocodylians, which include alligators, caimans, crocodiles and gavials, are called 'supreme survivors'. Having been extant for 200 million years, they are described as living fossils. They have been swamp dwellers from the age of reptiles when dinosaurs ruled the planet. Many mass extinctions and several new evolutions of animal groups have been witnessed by these reptiles. During their long history, these crocodylians have had a variety of successful adaptations to their ecological niche that have allowed these reptiles to remain almost unchanged for 200 million years.

These are amazingly adaptable creatures with elongated streamlined bodies, a long head, long jaws and a muscular tail which enables them to swim efficiently. While major parts of their bodies are hidden under water, all the sense organs which help in hunting lie above the surface of water and function efficiently. They have a flexible semi-erect posture which enables them to walk low on their bellies. These 'ambush predators' are notorious for their hunting skills and they have very sophisticated internal organs which fit their 'sit and wait' lifestyle. Unlike

other reptiles, the crocodilians have a four-chambered heart which works to their advantage while diving under water for long hours. Thus, it is not just their physical design but also the functioning of their bodies which is the cause, for their resilience.

The crocodilians are found only in the tropical and the sub-tropical regions because like all the other reptiles, they depend on external sources of heat to keep their bodies functioning. In many crocodilian habitats, hot season brings drought. As the water bodies dry up, these 'stealth hunters' dig themselves deep into the sides of dried-up riverbeds entombing themselves in the mud. Inside these burrows, they survive without food or water till the rains arrive. And biologists believe that this ability to endure long periods of starvation with patience is the key to their incredibly long tenure on the Earth.

Q.10. The author of the passage is primarily concerned with:

- (A) Describing the variations in the physical design of the crocodilians over the years.
- (B) Discussing the factors which have given an evolutionary edge to the crocodilians.
- (C) Explaining the functioning of the customized internal organs of the crocodilians.
- (D) Analyzing the survival strategies of the crocodilians.
- (E) Pointing at the structural similarities between crocodilians and other reptiles.

Q.11. The passage provides answers to all of the following questions EXCEPT:

- (A) Why cannot the crocodilians survive outside the tropical regions?
- (B) Why are crocodilians called living fossils?
- (C) Why do the crocodilians dig themselves deep into burrows when there is a drought?
- (D) Why do the crocodilians adopt the 'sit and wait' lifestyle?
- (E) What are the reasons for the amazing adaptability of the crocodilians?

**Directions: Consider each of the choices separately and select all that apply.**

Q.12. It can be implied from the passage that the crocodilians are called 'ambush predators' probably because:

- (A) They hide and capture the prey when it comes within striking distance.
- (B) They attack the prey with great speed and strength.
- (C) They hunt the prey only when they are really hungry.

**Directions for the questions 13–17: Choose two options which, when used separately in the sentence, produce complete sentences that mean the same.**

Q.13. It is puzzling to note that Selorita was taken to task for being garrulous, for as long as we have known her, she has had a reputation for being \_\_\_\_\_.

- (A) Verbose
- (B) Circumlocutory
- (C) Reticent
- (D) Whimsical
- (E) Precise
- (F) Quintessential

Q.14. Morality is no longer a notion governed by conviction: it seems to be more a matter of \_\_\_\_\_.

- (A) Integrity
- (B) Speculation
- (C) Uprightness
- (D) Convenience
- (E) Distinction
- (F) Handiness



- Q.15. In people afflicted with Parkinson's, the symptoms are so imperceptible that even battle-hardened physicians may not be able to sense its \_\_\_\_\_.
- (A) Onset (D) Precariousness  
(B) Diagnosis (E) Reappearance  
(C) Duration (F) Inception
- Q.16. As Lucy climbed up the social ladder, she unconsciously built up resentment among her cronies, which she could have neutralized by resorting to some \_\_\_\_\_ steps.
- (A) Redefining (D) Expiatory  
(B) Propitiatory (E) Regaling  
(C) Exacerbating (F) Hilarious
- Q.17. The prevailing culture in the firm was such that pragmatism \_\_\_\_\_ and consequently, idealism was relegated to the back burner.
- (A) Was shunned (D) Proved ineffective  
(B) Was dubious (E) Was idolized  
(C) Reign'd supreme (F) Was constantly practised

**Note: Questions 18 to 20 are based on the following passage.**

The evolution of earth's multitude of organisms is closely linked to the rise in oxygen in the oceans and atmosphere. Researchers and scientists have tried to unravel the mystery of Earth's oxygenation. Studies revealed that billions of years after its formation, the earth was surrounded by a suffocating mix of poisonous gases, and The Great Oxygenation Event (GOE) transformed the earth into a planet with an atmosphere rich in oxygen. Though much remains uncertain about the GOE, researchers say that it was approximately 2300 million years ago that this astonishing chemical makeover brought about a major environmental transformation on the earth.

The earth is 4500 million years old and until about 2300 million years ago, the atmosphere contained barely discernable quantities of oxygen. The levels of oxygen were propelled by the emergence of blue-green algae, also called Cyanobacteria. These bacteria produced oxygen as a byproduct of photosynthesis.

According to a recent research, cyanobacteria may have existed for 300 million years before the GOE occurred. The rise in oxygen levels did not just make the air breathable but also gave the earth an ozone layer which protects life from the ultraviolet radiations of the Sun. Though the rise in the levels of oxygen resulted in the evolution of complex life, it also led to the extinction of anaerobic bacteria, which was once the dominant life-form on earth, which is why the GOE is also called the 'oxygen catastrophe'.

- Q.18. The passage addresses all of the following issues related to the Great Oxygenation Event EXCEPT:
- (A) How has the event shaped the Earth?  
(B) Has it had any detrimental effect on the early inhabitants of the planet?  
(C) Which factor prompted the occurrence of the event?  
(D) Has it affected the evolution of complex life on the Earth?  
(E) How has it mopped up the noxious gases from the Earth's surface?

*Directions: Consider each of the choices separately and select all that apply.*

Q.19. In the passage, the author:

- (A) Demonstrates how a biological phenomenon marked the beginning of new life on the Earth.
- (B) Explains how an environmental change led to biological evolution on the Earth.
- (C) Elucidates how a biological innovation has led to environmental transformation on the Earth.

Q.20. It can be inferred from the passage that:

- (A) Microbial life thrived in the oceans even before the occurrence of the GOE.
- (B) Early animals may have evolved in an environment with less oxygen than today's.
- (C) Until about 2.4 billion years, the atmosphere contained only traces of oxygen.
- (D) The global oxygen levels would have remained constant before the GOE occurred.
- (E) The Earth could have become bright and airy only due to the GOE.

## Section-2: Verbal Reasoning

*Directions for Q. No. 1 to 5: Choose two options, when used separately in the sentence, produce complete sentences that mean the same.*

Q.1. Many analysts felt that the policy framers had taken \_\_\_\_\_ to a new high by laying down comprehensive guidelines on what cannot be aired by channels and even specified words that news readers should use to greet or take leave of the audience.

- |                    |                 |
|--------------------|-----------------|
| (A) Proscription   | (D) Propriety   |
| (B) Bowdlerization | (E) Stipulation |
| (C) Ostentation    | (F) Censorship  |

Q.2. A misconception held by many youngsters is that legendary stars in any field, particularly in theater, are seldom known for their \_\_\_\_\_.: the more renowned they are, the more arrogant they would be.

- |               |                 |
|---------------|-----------------|
| (A) Reticence | (D) Humility    |
| (B) Sagacity  | (E) Bashfulness |
| (C) Reclusion | (F) Vacillation |

Q.3. The palace, though in ruins now, evokes nostalgia, making us \_\_\_\_\_ its illustrious past, which can be imagined from the old oil canvas that depicts its previous splendor.

- |                      |                       |
|----------------------|-----------------------|
| (A) Recapitulate all | (D) Authenticate only |
| (B) Reminisce about  | (E) Confront with     |
| (C) Relate to        | (F) Muse over         |

Q.4. Leopold von Sacher Masoch, Austrian novelist, describes in, 'Venus In Furs' a very \_\_\_\_\_ condition, wherein a person could derive pleasure upon being humiliated, offended or ill-treated.

- |                 |               |
|-----------------|---------------|
| (A) Soporific   | (D) Aberrant  |
| (B) Confounding | (E) Deviant   |
| (C) Problematic | (F) Stigmatic |

- Q.5. He adored money and other supposedly good things of life; unfortunately, however, such a lifestyle gave him \_\_\_\_\_ tributes but never true intimacy.
- (A) Sycophantic (D) Fallacious  
(B) Pristine (E) Unctuous  
(C) Appropriate (F) Apt

**Note: Questions 6 to 9 are based on the following passage.**

Underground and Paris share a strange relationship. No other country in the world exhibits as strange a relationship to underground as Paris does. The underground is prominent for its long tunnels. It can be called as the arteries and intestine of Paris. It is also known as one of the best sewers. Below the main town of Paris exists another township with all its unique features. The old limestone quarries are located in the southern part of this underground. At the beginning of the 19<sup>th</sup> century, the tunnels were mined for building stone. They served as hiding places for revolutionaries during the Second World War. Germans used the tunnels as bunkers. Although there is no legal sanction for the present generation to use these underground tunnels, the place is a haven for runaways from community. These people who will do anything for a life in these tunnels are called ‘Cataphiles’. Pop culture ushered in new thinking amongst youngsters during the early 80s and 90s and the Paris underground became a symbol of freedom. Freedom without any curbs leads to lawlessness. The beginning of 20th century saw the entrances to these underground being closed. Police patrolling increased. Yet, they couldn’t manage to suppress the Cataphilia. Even today, Cataphiles make some of the best guides to the Paris underworld. While travelling by the metro, how many people living in Paris are aware that they may be speeding over the remains of their forefathers?

- Q.6. Select a sentence in the passage whose function is to indicate that Paris has a unique underground.
- Q.7. It can be inferred from the passage that people who love underground are:
- (A) Citizens fond of ruins (D) Unorthodox in their thinking  
(B) People born during World War-II (E) Drug abusers  
(C) Private property owners
- Q.8. Which of the following is the main purpose of the passage?
- (A) To convey that only Paris has a rich and unique underground.  
(B) To warn about the impending dangers in Paris’s underground.  
(C) To prove that cataphiles love underground life.  
(D) To point out that there was freedom in Paris’s underground.  
(E) To talk about Paris’s underground which is multi-faceted.
- Q.9. ‘Cataphiles make some of the best guides to the Paris’s underworld’ suggests that:
- (A) Normal citizens are unaware of the activities that take place in the underground.  
(B) It is difficult to traverse the Paris’s underground without a guide.  
(C) The only occupation that cataphiles excel in is offering directions in underground.  
(D) Cataphiles still exist in spite of resistance from the local authorities.  
(E) To get a first hand information about Paris’s underground, we can depend on cataphiles.

**Directions for Q. No. 10 to 14: Fill in the blanks so that the text is complete. Select the best option.**

Q.10. Nanotechnology, also known as ‘General–Purpose Technology’, is the future of the world because it is likely to influence all (1) \_\_\_\_\_. This technology assures efficiency of the highest order in all fields and this is (2) \_\_\_\_\_. But there is a (3) \_\_\_\_\_ to the whole issue. If the defense forces use it, it will result in deadly wars causing immense loss.

**Blank (1)**

- (A) Lifetime events
- (B) Natural life
- (C) Facets of life

**Blank (2)**

- (D) The icing on the cake
- (E) New wine in old bottle
- (F) As large as life

**Blank (3)**

- (G) Common approach
- (H) Sensual angle
- (I) Flip side

Q.11. It is (1) \_\_\_\_\_ that scientists have succeeded in developing artificial leaf. They say that the leaf for all (2) \_\_\_\_\_ purposes can produce energy from sunlight and water. If these claims can be endorsed, it could be the beginning of a new (3) \_\_\_\_\_ in the production of energy.

**Blank (1)**

- (A) Amazing
- (B) Startling
- (C) Refreshing

**Blank (2)**

- (D) Practical
- (E) Methodical
- (F) Inventive

**Blank (3)**

- (G) Revolution
- (H) Commotion
- (I) Motivation

Q.12. It is ironical that women who contribute overwhelmingly to the sustenance of life activities, live in abject poverty because their rights are denied, opportunities curtailed and (1) \_\_\_\_\_.

**Blank (1)**

- (A) Voices silenced
- (B) Ideas rejected
- (C) Revolution suppressed
- (D) Complaints addressed
- (E) Longevity denied

Q.13. Literary criticism, which has different forms and objectives, has many (1) \_\_\_\_\_ but still serves as a yardstick that provides the writer with the (2) \_\_\_\_\_ for self–assessment and also suggests ways of betterment. The writer is made to realize that arts, sciences and philosophy have (3) \_\_\_\_\_ but are based on co–existing concepts of truth and meaning.

**Blank (1)**

- (A) Designs
- (B) Fragilities
- (C) Inadequacies

**Blank (2)**

- (D) Tools
- (E) Motives
- (F) Results

**Blank (3)**

- (G) Similar goals
- (H) Typical parameters
- (I) Different perspectives

Q.14. The Bhopal Gas Tragedy and the Chernobyl accident showed the world the (1) \_\_\_\_\_ of damage and loss such tragedies could cause, especially nuclear tragedies. Damage caused by ionizing radiation to human cells may remain latent for a long time. Even the best of (2) \_\_\_\_\_ cannot prevent nuclear accidents and therefore, the need to have a (3) \_\_\_\_\_ to compensate for damage and losses arising from nuclear accidents becomes evident.

- | Blank (1)     | Blank (2)             | Blank (3)             |
|---------------|-----------------------|-----------------------|
| (A) Architect | (D) Safety standards  | (G) Strong leader     |
| (B) Formula   | (E) Technicians       | (H) Noteworthy notion |
| (C) Magnitude | (F) Populist measures | (I) Legal regime      |

**Note:** Questions 15 to 17 are based on the following passage.

Philosophy, according to Stephen Hawking and Leonard Mlodinow, in their new book *The Grand Design*; is dead. They argue that philosophy has failed to keep up with the latest developments in science, especially Physics, and that scientists have become the trailblazers of discovery in these quests for knowledge. According to them, it is not just philosophy which has become irrelevant but also natural theology. They claim that at any rate, the long-standing argument that a supernatural being, namely God, is the cause for the order apparent in the universe, is completely redundant. Just as Darwin's theory refutes the intervention of a supreme being in the appearance of the apparently miraculous design of the living forms, the multiverse concept—the concept of multiple universes—rejects the need for a benevolent creator to set things in motion. According to this concept, there are many universes and ours is just one of the many which has emerged spontaneously out of nothing and each universe is controlled by different sets of finely tuned physical laws. The authors write 'Because there is a law of gravity, the universe can and will create itself from nothing'. Yet, notwithstanding their argument that philosophy has passed away, the authors could not refrain from engaging in philosophizing about the nature of theories and their relationship to reality while putting forward their idea of fundamental physical account of the universe—the M-theory. Hence, theoretical physics, at its most abstract, disengages itself from ordinary empirical science and enters the sphere of philosophy. Philosophy, as suggested by the authors, is not dead but it is being killed by science, because the most profound arguments in the field of science, especially physics, are not scientific but philosophical. Thus there is no less truth in Etienne Gilson's observation that 'Philosophy always buries its undertakers'.

Q.15. In the second paragraph of the passage, the author's attitude towards the ideas put forward by Hawking and Mlodinow in their book *The Grand Design* can best be described as:

- |                                |                                 |
|--------------------------------|---------------------------------|
| (A) Disapproving and sarcastic | (D) Superior and condescending  |
| (B) Skeptical but resigned     | (E) Apologetic and conciliatory |
| (C) Respectful and admiring    |                                 |

**Directions:** Consider each of the choices separately and select all that apply.

Q.16. As understood from the passage, the views put forth by Stephen Hawking and Leonard Mlodinow in their book *The Grand Design* are:

- (A) Posing a threat to our most cherished belief systems.
- (B) Substantiating our fundamental assumptions regarding the mysteries of the universe.
- (C) Altering our understanding of the most fundamental concepts about the universe and its origin.

Q.17. The word 'undertakers' as it is used in the passage refers to:

- |                                      |  |
|--------------------------------------|--|
| (A) Philosophers                     | (D) The authors of <i>The Grand Design</i> |
| (B) Scientists                       | (E) Charles Darwin                         |
| (C) Both philosophers and scientists |  |

**Note: Questions 18 to 19 are based on the following passage.**

Japanese salmon thought to have been extinct for 70 years has been discovered in a lake near Mount Fuji. The kunimasu salmon, also called the black kokanee, is a subspecies of sockeye salmon that's found only in Japan. Unlike true sockeye, which migrate between freshwater and the oceans, the many types of kokanee salmon live and reproduce entirely in lakes. The kunimasu was believed to have been wiped out in the 1940s after a hydroelectric dam raised acidity levels in the fish's only home, Lake Tazawako in northern Japan's Akita Prefecture. Salmon are sensitive to water's acidity, and drastic changes in pH can affect young salmon's survival.

A seemingly unsuccessful 1935 program to release kunimasu eggs in Lake Saiko, in the foothills of Mount Fuji, had been forgotten until recently, when the head of a local fishing association sent an odd sample to a Japanese television personality who is obsessed with fish. Sakana-kun—a nickname meaning Mr Fish—is best known for appearing on TV in his trademark white laboratory coat and blowfish-shaped hat. His self-taught expertise earned him the title of visiting associate professor at Tokyo University of Marine Science and Technology.

'The kunimasu salmon is very close in appearance to the common himemasu salmon, a species of landlocked sockeye salmon, except that one that was sent to me was green and black instead of the more common silver color' of the himemasu, Sakana-kun told National Geographic News. Aware that the specimen was unusual, Sakana-kun sent the fish to Tetusji Nakabo, a professor of ichthyology at Kyoto University, where 17 samples of the extinct salmon had been preserved.

'When I first looked at it, I realized it might be a kunimasu,' Nakabo said. 'But it took me one month to confirm beyond a doubt my initial suspicions. At that moment, I felt it was incredible, unbelievable.'

'Kunimasu is still alive!'

Q.18. As per the passage, all of the following are true EXCEPT:

- (A) Kokanee salmon cannot survive, if pH values change drastically.
- (B) Kokanee salmon cannot survive outside Japan.
- (C) Kokanee salmon was recently spotted in Lake Saiko.
- (D) Kokanee salmon seem to breed well in Lake Tazawako.
- (E) Kokanee salmon's habitat is mostly in lakes.

Q.19. 'The head of a local fishing association sent an odd sample to a Japanese television personality who is obsessed with fish.' 'Obsessed' in the given context means:

- (A) Fond of
- (B) Fixated on
- (C) Convinced about
- (D) In love with
- (E) Rued

**Note: Question 20 is based on the following passage.**

Driving along an oil company road in Peru's northern Amazon, Patricio Pinola Chuje looked out of the window. He nodded beyond a green wall of rain forest.

'I don't know if they are in this area, but I know they are farther south in other places,' said Pinola, an Achuar Indian. 'They come out by the rivers.'

'They' refers to unseen Amazon Indian tribes said to live in voluntary isolation in the western headwaters of the Amazon in Peru and Ecuador.

Global energy prices have fueled oil and gas booms across oil-laden Amazonian lands. But supporters of native groups say the boom is a bust for remote Amazon Indians, who suffer both physically and socially when exposed to the modern world.

‘Isolated Indians are especially vulnerable to any contact, because they have no immunity to outsiders’ diseases,’ said David Hill, a spokesperson for Survival International, a London-based group that defends the rights of uncontacted tribes.

Other groups add that Indians’ rights to their traditional lands are increasingly being violated by development-hungry governments. Now civic groups and native organizations are pushing governments and the courts to rein in oil development. In December, a coalition of groups announced it would petition the Organization of American States to protect the Cacataibo, said to be the last uncontacted tribe in the central Peruvian rain forest.

The elusiveness of some rain forest tribes, coupled with the threat of infection posed by outsiders, makes getting an accurate census near impossible, activists say. But Survival International estimates that some 15 uncontacted tribes live in the Peruvian Amazon alone.

Spotting them is rare. But in October, a plane searching for illegal loggers managed to photograph 21 natives standing near palm shelters on the banks of the Las Piedras River in Peru’s southeastern Amazon. Days after the photos ran on international news wires, Peruvian President Alan Garcia suggested in a newspaper editorial that unseen tribes were largely a ruse used by groups opposing development.

Q.20. In the passage, the expression ‘ruse’ means:

- |                    |              |
|--------------------|--------------|
| (A) Deception      | (D) Fixation |
| (B) Forthrightness | (E) Summary  |
| (C) Slogan         |              |

## ***Practice Test - 2***

The practice test is important to assess your preparation. It will help you identify your strong areas and weak points. You can take corrective measures accordingly. Keep the following points in mind before you take the practice test.

- You need 3 hours and 30 minutes to take the complete test.
- At the beginning of each section, time allotted for that section is mentioned.
- Take the test under simulated conditions.
- The actual test is computer based but the practice test requires you to mark the answers on paper.
- After completing the test, verify your answers with the key provided.
- Identify your mistakes and correct them.
- work on reading the time taken to complete each section.

## ***Analytical Writing***

### ***Analyze an Issue***

**Duration: 30 minutes**

**Keep the following points in mind while attempting the issue task:**

- Read the instructions thoroughly before responding.
- Use good supporting examples and reasons.
- Map important points.
- Follow the conventions of standard English grammar.
- Proofread and edit your essay.

**Issue Topic**

When we talk about Education, most of the time we think about school. We often view school in a traditional, formal sense. Many people believe that true learning can only take place in a formal classroom setting. Others feel education occurs in many different forms and environments.

State if you agree or disagree with the statement above. Explain your stand and support it with suitable reasons and examples.

**Analyze an Argument**

Duration: 30 minutes

Keep the following points in mind while attempting the argument task:

- A short argument will be presented.
- You are not required to give your opinion.
- You are required to evaluate the given argument.
- Identify the important elements, conclusion, evidence and flaws in the given argument.

**Argument Topic**

The following appeared in a newspaper daily:

Entrepreneurs seem to be maintaining better health despite lacking basic healthcare necessities. One in four entrepreneurs lack health insurance, contrasting with the one in 10 other workers who are uninsured — a difference of 15 percentage points. The reason for that difference is not clear, but it could either reflect the high cost of health insurance for individuals and small business owners, or a greater willingness on the part of entrepreneurs to accept the risks inherent in not having health insurance. Entrepreneurs are also significantly less likely than other workers to say they have visited a dentist in the past year. Therefore, entrepreneurs are less likely than other employed adults to report having chronic health problems and more likely to report better health behaviors.

Discuss with specific examples how the evidence given in the argument can be supported or weakened.

**Section-1: Verbal Reasoning**

Duration: 30 minutes

20 Questions

*Directions: The passage given is followed by a few questions. You have to answer the questions on the basis of what is directly stated or can be logically inferred from the given passage. Choose the option that best answers the question.*

Your egoist, like the solitary beasts, lives only for himself; your altruist declares that he lives only for others; for either there may be success or failure but for neither can there be tragedy. For even if the altruist meets nothing but ingratitude, what has he to complain of? His premises abolish his grounds of complaint. But both egoist and altruist are philosophical abstractions. The human being by nature and necessity is neither egoist nor altruist; he trims a



difficult course between the two; for the most part we are, within the limits of our powers of expression, *egotists*, and our desire is to think and if possible, talk and write about this marvelous experiment of ourselves, with all the world—or as much as we can conveniently assemble—for audience. There is variety in our styles. Some drape the central figure; some let it rather appear than call attention to it; some affect a needless frankness: ‘I am an egotist, mind you, and I pretend nothing else’; some by adopting a pose with accessories do at least develop so great and passionate an interest in the accessories as to generalize and escape more or less completely from self. Egotism like an eggshell is a thing from which to escape; the art of life is that escape. The fundamental art of life is to recover the sense of that great self-forgetful continuous life from which we have individually budded off. Many people have done this through religion, which begins with a tremendous clamor to some savior god or other to recognize us and ends in our recognition of him; or through science, when your egotist begins with: ‘Behold me! I, I your humble servant, am a scientific man, devoted to the clear statement of truth,’ and ends with so passionate a statement of truth that self is forgotten altogether.

Q.1. According to the passage, all of the following are true EXCEPT:

- (A) Human categorization as selfless or selfish is a general concept.
- (B) The author is not too positive about religion as a medium to discover individual differences.
- (C) The unselfish and the selfish have an equal share of calamities in their lives.
- (D) The art of life is to break the shackles of selfishness and self-importance.
- (E) Humanity is neither completely selfless nor self-centered.

Q.2. According to the passage, the author believes that:

- (A) The path of recognizing the supreme force invariably leads to introspection.
- (B) To lead a better life one must get away from focusing attention only on himself.
- (C) One is an altruist by choice but is an egotist by birth.
- (D) A scientist in pursuit of truth sometimes ends up questioning the truth.
- (E) The basic principle of life is that humanity has evolved from a single bud.

**Question 3 is based on the following passage.**

Q.3. Which of the following best completes the passage?

Honeybees gather propolis, a resin, from tree bark and leaves. They combine this resin with nectar, creating a mix of wax, pollen and bee bread. They then use this substance to seal their hives, protecting it from outside contaminants. They also use propolis at the entrance to the hive to sterilize themselves as they come and go. A study reveals that when faced with pathogenic fungi, wild bees line their hives with more propolis because:

- (A) Unlike synthetic antibiotic, propolis has no side effects.
- (B) A propolis extract significantly reduces the rate of infection.
- (C) Researchers know propolis is an effective antifungal agent.
- (D) Propolis is used to heal sores and ulcers, internally and externally.
- (E) It contains a perfectly balanced, nutritive substance.

Q.4. Which of the following can be inferred from the passage?

The cockroach, the pest whom we want to smash to death the moment we see it in the kitchen, forms a congenial society with consensual rules. Scientists have come to the conclusion that cockroaches practice a simple form of democracy. In its society, each insect has equal standing and decisions made by group override those of individuals, and such group decisions govern what the entire group would do.

- (A) Democracy is only a human invention, thought out and practiced by Homo sapiens.
- (B) The field of socio-biology throws not only surprises at human beings but also teaches them some lessons.
- (C) Decision making in cockroaches is a group activity, with each member playing its role by common agreement.
- (D) There are social practices in animal societies that have an evolutionary origin, and are handed down to human beings.
- (E) Many other animals and even insects like the honey bee we admire and the cockroach we detest teach us to be humble and appreciative.

*For questions 5 to 9, fill in the blanks so that the text is complete. Select the best option for each numbered blank from the options given.*

Q.5. From (1) \_\_\_\_\_ slogans and exaggerated imagery to extreme publicity stunts and even subliminal messaging, marketing majors have tried nearly everything to sell a product.

**Blank (1)**

- (A) Ardent
- (B) Cantankerous
- (C) Deceptive
- (D) Dangerous
- (E) Promising

Q.6. Even though the (1) \_\_\_\_\_ of religion and science in themselves are clearly marked off from each other, nevertheless there exists between the two strong (2) \_\_\_\_\_ relationships and dependencies.

**Blank (1)**

- (A) Realms
- (B) Controversies
- (C) Transgressions

**Blank (2)**

- (D) Reciprocal
- (E) Antithetical
- (F) Frustrating

Q.7. Native to North America, the common turkey was (1) \_\_\_\_\_ between 800 BC and 200 BC by the people of pre-Columbian Mexico. However, these early Americans weren't the only ones to breed the bird. Scientists conducting DNA analysis of ancient turkey remains recently (2) \_\_\_\_\_ that the Pueblo peoples of what is now the southwestern United States achieved their own distinct domestication around 200 BC. Despite centuries of successful breeding, some researchers believe that the Pueblo turkey may have become (3) \_\_\_\_\_, but no one knows for sure.

**Blank (1)**

- (A) Floundered
- (B) Tamed
- (C) Incinerated

**Blank (2)**

- (D) Discovered
- (E) Announced
- (F) Nurtured

**Blank (3)**

- (G) Extinct
- (H) Prevalent
- (I) Ubiquitous

Q.8. There are, as yet, no vegetation types or ecosystems whose study has been (1) \_\_\_\_\_ to the extent that they no longer (2) \_\_\_\_\_ ecologists.

**Blank (1)**

- (A) Exhausted
- (B) Prolonged
- (C) Delayed

**Blank (2)**

- (D) Require
- (E) Hinder
- (F) Interest

Q.9. Since many casual smokers develop lung cancer and many (1) \_\_\_\_\_ smokers do not, scientists believe that individuals differ in their (2) \_\_\_\_\_ the cancer-causing agents known to be present in cigarette smoke.

**Blank (1)**

- (A) Compulsive
- (B) Irregular
- (C) Healthy

**Blank (2)**

- (D) Reliance upon
- (E) Susceptibility to
- (F) Concern about

*Questions 10 to 12 are based on the following passage.*

The most popular of the stage entertainments which survived the Roman period were the mimes—short scenes given by two or three actors, with spoken dialogue. In these skits, the actor impersonated rustics, sight-seeing provincials, pompous officials, and other decent but dull types, often with obscene and indecorous accompaniments. A contemporary writer has recorded how Horace and his friends laughed over the representation of a bombastic rural priest who wore a loud purple robe with broad stripes and carried a pan of coals, according to the requirements of his office. Of course such a figure, once connected with the ancient dignity of the patricians, could easily be converted into burlesque. The dialogue of the mimes was in verse, and Roman knights sometimes employed themselves in their composition. The prosperous, as well as the lower class delighted in them.

Pantomimic shows, usually given by a single dancer, were of three kinds: simple mimicry without music or words, but with dancing; secondly, mimicry with instrumental music; and thirdly, mimicry with music and words—the latter frequently given to a chorus. Some of the pantomimes were modifications of the Atellan farces fables and *satire*. Often they reproduced tales of abnormal depravity, and always they were salted with coarse buffoonery and indecent humor, exhibiting, fully and unmistakably, by exaggerated gestures, the various passions and emotions of mankind. Cymbals, gongs, castanets, rattles and drums were used. In time these entertainments became so gross that even easy-going citizens were forced to discountenance them. Dill, the historian of Roman society, writes: ‘The Theater and the circus were for five centuries the great corrupters of the Roman world.’

It goes without saying that such associations did not improve the drama. The Roman world, or such part of it as frequented the spectacles, was not of the sort to find delight in the more subtle revelations of character. Thrilling scenes were for them almost daily enacted in real life: their malefactors were stretched on the cross, or tossed to the beasts of the arena; their generals, returning from war, led their captives in chains through the streets. Such plays as were given had to compete, very unequally, with the spectacles and circuses, as well as with the turbulent and sensational life of the city; and they were further degraded by being placed, on occasion, on the circus programs between the gladiatorial shows and the wild beast combats. Moreover, the political and social condition of the city was averse to the cultivation of the arts. As the empire expanded, it was the custom for sons of patricians to serve in the wars and to administer the government in distant provinces. In consequence, whole families became extinct and the aristocracy dwindled, while the prestige of the city drew into its confines a strange crowd of outlanders, barbarians, prisoners of war, tradesmen from foreign countries, hangers-on and scamps of all sorts. The result was

that many of the people in a theater audience knew but little Latin—only sufficient to enable them to trade—and their taste was inevitably low. They honestly preferred rope dancing and bloody sights of the arena. It followed naturally that playwrights found scant market for their wares; and even the lowest actors despised the verdict of the masses.

Q.10. Select the sentence which shows that clergy who once belonged to the upper class was ridiculed.

Q.11. The passage mainly deals with

- (A) How Romans entertained themselves.
- (B) Decline of theatre in Roman period.
- (C) Why Romans were averse to Latin.
- (D) Likes and dislikes of the masses.
- (E) Influence of social milieu on culture.

Q.12. What can be inferred from 'In consequence whole families became extinct and the aristocracy dwindled, while the prestige of the city drew into its confines a strange crowd of outlanders, barbarians, prisoners of war, tradesmen from foreign countries, hangers-on and scamps of all sorts.'?

- (A) Patricians patronized art.
- (B) Glory of a city depended on common men.
- (C) Class system came to an end.
- (D) People from outside took control of the society.
- (E) Joint family system became extinct.

**Directions for the questions 13 - 17: Choose two options which, when used separately in the sentence, produce complete sentences that mean the same.**

Q.13. \_\_\_\_\_ the risks associated with nuclear energy program causing havoc in their wake, many countries are venturing into it.

- (A) Hence
- (B) Notwithstanding
- (C) Despite
- (D) Although
- (E) Now that
- (F) In view of

Q.14. The recent spate of political \_\_\_\_\_ in several Asian and African countries has led to flight of capital overnight to more politically and economically stable countries.

- (A) Congregation
- (B) Turmoil
- (C) Tumult
- (D) Fracas
- (E) Brouhaha
- (F) Confabulations

Q.15. The research fraternity, the ruling class and the media across the globe are \_\_\_\_\_ on the repercussions of the impending war.

- (A) Unanimous
- (B) Jubilant
- (C) Indifferent
- (D) Consistent
- (E) Anonymous
- (F) Acrimonious

- Q.16. Federal laws may \_\_\_\_\_ any law made by a legislature if in Parliament's opinion they transgress the rule of law.
- (A) Outlaw (D) Supplant  
 (B) Regress (E) Commemorate  
 (C) Annex (F) Supersede
- Q.17. In the ancient days, the value system was well framed and disrespect towards those accepted norms was seen as \_\_\_\_\_, even as a sign of madness.
- (A) Adventurous (D) Impermissible  
 (B) Frivolous (E) Irrational  
 (C) Willful (F) Acceptable

*Questions 18 to 20 are based on the following passage.*

The potential and promise of socialism against the neoliberal order needs an agency which can evoke the alternative in freshly minted terms that capture the popular imagination.

So why is the free press contraindicative in socialism? That may be begging the question because what is commonly understood to be the free press is, in the socialist scheme, the bourgeois press on the other side of the class divide which is not free of the dictates of the market, the whims of the advertising and the caprice of the capital that drives it. The free press of the socialist imagination is more liberating than liberalist in which, as Lenin put it, 'all opinions of all citizens must be freely published'. The evolved socialized press would have its printing presses, newsprint, advertising, all equitably provided by the state, and be a touchstone of the post-revolutionary order.

In the real politik of the socialist project, however, the press did not quite proceed beyond the transitional 'propagandist, agitator and organizer' function that Lenin set for it in the waging of war communism. In the ensuing nomenclatura order of the Soviet Union and Eastern Europe, a lead newspaper or news agency (like Pravda and Tass) set the agenda and corralled the news to be purveyed on a given day, subserving the interests of the state and the party. It was a command performance which lulled the political leadership into self-approbation even if the intended readership did not necessarily buy into it. Amartya Sen has drawn attention to the damning effects of such information blight and to why democracies, because the free press sounds an early warning alarm the moment the symptoms appear, are able to keep man-made famines at bay, whereas the socialist media and bureaucracy are so mutually parasitic that they either cannot or will not see the signs of a gathering storm until it is too late.

This vestigial media mentality would, one would imagine, be demolished as it runs headlong into a blindingly high-visibility, high-velocity information society. But then, it is as diehard as it is anachronistic. Russia sans socialism and buttressed by the right to information guaranteed by the constitution of 1993 and the specific Law on the Mass Media before that (1991) is not a better or safer place for journalists. An elaborate state apparatus dealing with the media continues to work overtime to withhold rather than provide information and cut journalists off from the corridors of power. On the other hand, contemporary socialist parties in, and aspiring to, power in different parts of the world with innovative pro-people programs that contest the overweening power of neo liberalism and finance capital continue to be somewhat reticent or backward in their appreciation of the merits of independent journalism. This, then, becomes their Achilles heel which their capitalist detractors target with some success.

- Q.18. Consider the following choices and select all that apply. According to the passage,
- (A) There is no evidence that democracy encourages freedom of press.  
 (B) There is enough logic to prove that socialism discourages independent press.  
 (C) There is no logic in the idea that free press is inadvisable in a socialistic set-up.

- (D) There is enough evidence to prove that capitalists encourage individuals to voice opinion.  
(E) There is no logic behind granting freedom of press in any political scenario.

Q.19. According to the passage, the underlined phrase means:

- (A) Are somewhat unwilling to recognize the flipside of independent journalism.  
(B) Believe that journalists must be cut off from the corridors of power.  
(C) Are attacked by their opponents for failing to appreciate the benefits of free press.

Q.20. Select the sentence that best describes the attitude of the public to bowdlerized information.

## Section-2: Verbal Reasoning

*For questions 1 to 5, choose two options, when used separately in the sentence, produce complete sentences that mean the same.*

Q.1. The ecological balance has been tampered quite often, most frequently by human \_\_\_\_\_

- (A) Interference (D) Disturbance  
(B) Prediction (E) Allocation  
(C) Observation (F) Proliferation

Q.2. The author of the book 'Beyond Scope' is as \_\_\_\_\_ as any Indian writer is to local problems, although she grew up in a foreign place and did not take to writing until her adulthood.

- (A) Sensitive (D) Informed  
(B) Callous (E) Complicated  
(C) Touchy (F) Confused

Q.3. It is rather \_\_\_\_\_ of a physician to reply curtly to the media on an important issue like euthanasia.

- (A) Uncouth (D) Unprofessional  
(B) Ubiquitous (E) Unimaginable  
(C) Unreliable (F) Unethical

Q.4. A new nervousness about the safety of using nuclear energy has \_\_\_\_\_ the world after the nuclear disaster in Japan.

- (A) Gripped (D) Neutralized  
(B) Overwhelmed (E) Crumbled  
(C) Seized (F) Committed

Q.5. A general trend among the youngsters today is not just to go on long drives but to ensure that their sophisticated cameras are with them as there seems to be an/a \_\_\_\_\_ with photography among the youngsters.

- (A) Obsession (D) Agenda  
(B) Fixation (E) Phenomenon  
(C) Aptitude (F) Imagination

*Questions 6 to 8 are based on the following passage.*

Good sense is, of all things among men, the most equally distributed; for everyone thinks himself so abundantly provided with it, that those even who are the most difficult to satisfy in everything else, do not usually desire a larger measure of this quality than they already possess. And in this it is not likely that all are mistaken. The conviction is rather to be held as testifying that the power of judging aright and of distinguishing truth from error, which is properly what is called good sense or reason, is by nature equal in all men; and that the diversity of our opinions, consequently, does not arise from some being endowed with a larger share of reason than others, but solely from this, that we conduct our thoughts along different ways, and do not fix our attention on the same objects. For to be possessed of a vigorous mind is not enough; the prime requisite is rightly to apply it. The greatest minds, as they are capable of the highest excellences, are open likewise to the greatest aberrations; and those who travel very slowly may yet make far greater progress, provided they keep always to the straight road, than those who, while they run, forsake it.

Q.6. The primary purpose of the passage is:

- (A) To indicate that all individuals are precocious.
- (B) To illustrate that great people think alike.
- (C) To convey that all have an equal share of commonsense.
- (D) To show that only a few can become successful.
- (E) To prove that achievers are highly focused.

Q.7. Select the sentence that shows that great people also waver while they attempt to reach their goals.

Q.8. Consider the following choices and select all that apply. According to the passage, ‘Good sense’ is:

- (A) A boon bestowed on the greatest minds.
- (B) Nurtured carefully by the elite.
- (C) Prevalent in those who avoid erroneous decisions.

*For questions 9 to 13, fill in the blanks on selecting the best option for each numbered blank so that the text is complete.*

Q.9. We accepted the theory that as people become more independent of one another, they begin to feel so isolated and lonely that freedom becomes (1)\_\_\_\_\_ condition that most will seek to (2)\_\_\_\_\_ .

**Blank (1)**

- (A) A common
- (B) A negative
- (C) A political

**Blank (2)**

- (D) Escape
- (E) Enter
- (F) Impose

Q.10. The current penchant for (1) \_\_\_\_\_ a product by denigrating a rival, named in the advertisement by brand name, seems somewhat (2)\_\_\_\_\_: suppose the consumer remembers only the rival’s name?

**Blank (1)**

- (A) Criticizing
- (B) Touting
- (C) Buying

**Blank (2)**

- (D) Foolhardy
- (E) Insipid
- (F) Gullible

Q.11. Scientists' pristine reputation as devotees of the disinterested pursuit of truth has been (1) \_\_\_\_\_ by recent evidence that some scientists have deliberately (2) \_\_\_\_\_ experimental results to further their own careers.

**Blank (1)**

- (A) Reinforced
- (B) Exterminate
- (C) Compromised

**Blank (2)**

- (D) Fabricated
- (E) Published
- (F) Suppressed

Q.12. Dependence on foreign sources of heavy metals, though (1) \_\_\_\_\_, remains (2) \_\_\_\_\_ for United States foreign policy.

**Blank (1)**

- (A) Excessive
- (B) Diminishing
- (C) Unavoidable

**Blank (2)**

- (D) A problem
- (E) A priority
- (F) An emergency

Q.13. Although nothing could be further from the truth, freight railroads have been (1) \_\_\_\_\_ of (2) \_\_\_\_\_ the nations shift from oil to coal by charging exorbitant fare to transport coal.

**Blank (1)**

- (A) Proud
- (B) Conscious
- (C) Accused

**Blank (2)**

- (D) Impeding
- (E) Accelerating
- (F) Contributing to

**Questions 14 to 16 are based on the following passage.**

Rachel Carson's 'Silent Spring', credited with being the forerunner of the modern environmental movement, is a well-documented story on the use of toxic chemicals in agriculture and of their widespread fatal effects on plants and animals. Rachel Carson's training as a scientist bridged the gap between lay observation and science. Her conviction in what she wrote combined with her skills as a writer ensured that the book reached readers around the globe.

The book accused the pesticide industry of being detrimental to the environment, especially of destroying bird species. Indeed, the title 'Silent Spring' alludes to an all-too-possible spring when birds would no longer sing because they would all have been exterminated by pesticides. The author also said that the chemical industry misinformed the public about the effects of its products and that the United States administration accepted the industry's claims without verifying them.

While documenting the horrors of synthetic pesticides, the author traced the link between chemical companies and the political economy of the time and accused the two of letting profit take precedence over health. Capitalist economies and corporations that dictate to government were not new scenarios even at that time, but Rachel Carson introduced new characters into this old drama. Unselfconsciously and scientifically, she wrote that all life forms were connected and the act of injecting poisons into life cycles would soon affect human life.

Her views were encapsulated by Lord Edward Shackleton, who wrote the introduction to the British edition of Silent Spring. He was the son of Ernest Shackleton, the polar explorer, but was famous in his own right as a conservationist. In 1963, he participated vigorously in a historic five-hour-long debate on Silent Spring in the House of Lords; never before was a book debated for so long in the British Parliament. In his introduction to the book, Shackleton wrote: 'Ecologists more and more are coming to recognize that... man is an animal and indeed the



most important of all animals and that however artificial his dwelling, he cannot with impunity allow the natural environment of living things from which he has so recently emerged to be destroyed.’

Q.14. Rachel Carson’s ‘Silent Spring’ appealed to all sections of the society because:

- (A) She highlighted the dangers of synthetic pesticides.
- (B) Ecologists world around were speaking in the same tone as hers.
- (C) It was the only relevant book published on the detrimental effects of pesticides.
- (D) She was a skilful writer and was convinced about what she was writing.
- (E) She wrote fearlessly against the nexus between chemical companies and politicians.

Q.15. Rachel Carson’s training as a scientist bridged the gap between lay observation and science. It shows that:

- (A) Capitalist economies and corporations cannot be convinced easily.
- (B) Man has very scanty respect to the environment in which he lives.
- (C) Her ideas were not like old wine in a new bottle, so were popular.
- (D) Her dual role was an added advantage to prove her point.
- (E) A layman’s point of view and a professional point of view do not match

Q.16. The author in her book purports to:

- (A) Raise an objection
- (B) Warn the humans
- (C) Save the environment
- (D) Explain her point of view
- (E) Criticize the government

**Question 17 is based on the following passage.**

Q.17. Which of the following best completes the passage?

In Africa the mask transforms mortals into gods and makes a political point. The mask is the centerpiece of a costume, often with props, that the wearer carries during a masquerade, a ritual ceremony performed before a community. Some masquerades are entertainment—a parade, for example, or dance that reinforces the cultural identity of a community. Others remain embedded in religious or social ritual. In these performances, the masquerader may serve as a kind of moral policeman: instructing, punishing, maintaining and restoring order, or presiding over a passage—boy to man, citizen to leader, planting to harvest. Therefore, it is obvious that:

- (A) In the realm of the spirit world, the mask is a mere facade.
- (B) In the realm of the spirit world, the mask is utterly transformative.
- (C) In the realm of the spirit world, the mask belongs to the spirit of the mortals.
- (D) In the realm of the spirit world, the man in the mask adorns different roles.
- (E) In the realm of the spirit world, the masked man is just playing a role.

**Question 18 is based on the following passage.**

A bigwig of one of the UK’s leading power and gas companies has admitted that power firms face a real challenge in gaining customer trust. Customers no longer trust energy companies to do the right thing for them. It is therefore imperative for firms to get consumers on board before prices rise to levels that are too high.

Q.18. The official’s conclusion logically depends on which of the following assumptions?

- (A) According to recent statistics, consumer trust is at an all time low which was reflected in customer feedback.

- (B) It was important for the utilities to connect with energy users, if those firms expect customers to get on board.
- (C) Power companies are aware that their prices are rising and probably expect greater backlash from their customers.
- (D) There's hardly anything worse for company morale than leaders who practice the 'Do as I say, not as I do' philosophy.
- (E) Power companies may have gained in development, but they have lost in trust.

**Questions 19 to 20 are based on the following passage.**

Barcelona is an extraordinary city. It is obviously memorable for its fantastic architecture, dominated by the impressive, quirky, imaginative and joyful creations of Antonio Gaudi and other architects of the 'Modernista' tradition of the early 20th century. It was home to some of the most interesting artistic innovators of the 20th century – from the artists Picasso and Joan Miro to the musicians Isaac Albeniz and Enrique Granados. It has amazing food, in which the glories of being near the sea are adequately reflected, and it is clear that in this city the manifold pleasures of eating and drinking are appreciated fully and indulged in.

The city has lovely avenues with charming walkways and other pedestrian spaces that make perambulation not just a pleasure but a sensory revelation. It has a culture that values the streets as points of social contact, exchange and intermingling – as testified by the large numbers of people who stroll along them without any apparent purpose than to enjoy it, from early evenings to the wee hours of the mornings all through summer. Most of all, though, Barcelona has spirit: the intense, passionate celebration of life that can be seen not only as the Catalan way of doing things but as a broader Spanish response to all sorts of adversity.

But even this remarkable spirit seems to have been shaken by the economic crisis that continues to fester and threatens the material security of the majority of Spaniards. The economic decline in Spain is now several years old, but what citizens are being offered is nothing like respite: only several more years of material pain with no clear horizon of improvement other than a vague hope that eventually global and European recovery (that currently are nowhere in sight) will cause Spanish economic conditions to improve as well.

Q.19. Select the sentence which indicates that people of Barcelona are sensuous.

Q.20. We can infer from the last paragraph that:

- (A) Spaniards love food and culture and were a spirited lot.
- (B) Recovery of Spain is in the hands of Europeans.
- (C) Spanish crisis has been hovering over them for some time.
- (D) They had to suffer the situation for a long time.
- (E) The government failed to address the problem of the Spanish.

# CHAPTER 10

## Important Word Groups

In the following word groups, you will find words that have a common theme. However, the part of speech may be different.

### **Aid**

Encourage  
Promote  
Endorse  
Bolster  
Authenticate  
Expression  
Advocate  
Anchor  
Assist  
Champion  
Stalwart  
Maintenance

### **Amateur**

Apprentice  
Newcomer  
Novice  
Newbie  
Proselyte  
Greenhorn  
Neophyte

Probationer  
Novitiate  
Inchoate  
Tenderfoot  
Nascent

### **Anger**

Acrimony  
Chagrin  
Irritation

### **Arrogance**

Audacity  
Aloofness  
Contemptuousness  
Egotism  
Hubris  
Disdain  
Hauteur  
Insolence  
Vanity

### **Astonish**

Amaze  
Astound  
Flabbergast  
Dumbfound  
Daze  
Boggle

### **Bad**

Abominable  
Atrocious  
Defective  
Awful  
Junky  
Inferior  
dreadful

### **Banal**

Commonplace  
Trite  
Stereotyped  
Hackneyed

Quotidian  
Antiquated  
Outmoded  
Prosaic

**Bickering**

Altercation  
Squabble  
Tantrum  
Wrangle  
Huff  
Brawl  
Fracas  
Affray  
Schism

**Cacophony**

Dissonance  
Jangle  
Noise  
Discord  
Bedlam  
Babble  
Harshness  
Commotion  
Uproar  
Tumult  
Hubbub

**Calumny**

Abuse  
Obloquy  
Berate  
Slander  
Censure  
Decry  
Quibble  
Denounce  
Opprobrium  
Carping  
Panning  
Inveigh

**Chauvinistic**

Biased  
Obstinate  
Dogmatic

**Contrite**

Humble  
Sorry  
Regretful  
Ashamed  
Penitent  
Weebegone

**Debilitate**

Disable  
Cripple  
Undermine  
Attenuate  
Incapacitate  
Hamstring  
Dismember  
Abase

**Demise**

Downfall  
Finish  
Exit  
Quietus  
Necrosis  
Repose  
Knell  
Perish  
Macabre  
Fatality  
Oblivion  
Curtains  
Wraith  
Casualty

**Define**

Ascertain  
Characterize  
Construe  
Denote  
Describe

Designate  
Elucidate  
Exemplify  
Expound  
Illustrate  
Interpret  
Label  
Prescribe  
Represent  
Specify  
Spell out  
Tag  
Translate

**Ersatz**

Cast  
Facsimile  
Replica  
Archetype  
Paradigm  
Miniature  
Photostat  
Counterpart  
Vicarious

**Exculpate**

Condone  
Vindicate  
Dismiss  
Exonerate  
Pardon  
Amnesty

**Exploit**

Achievement  
Enterprise  
Escapade  
Venture  
Coup

**Farcical**

Amusing  
Affecting  
Absurd  
Derisory

Funny  
Slapstick  
Comical  
Stupid  
Droll  
Campy

**Fear**

Abhorrence  
Dread  
Funk  
Trepidation  
Qualm  
Despair

**Fortune**

Affluence  
Prosperity  
Property  
Portion  
Substance  
Thriving  
Bounty  
Opulence  
Myriad  
Copiousness

**Gluttonous**

Greedy  
Covetous  
Penurious  
Avaricious  
Devouring  
Voracious

**Great**

Abundant  
Bulky  
Colossal  
Enormous  
Extravagant  
Gigantic  
Humongous  
Immense  
Inordinate

Mammoth  
Prodigious  
Stupendous  
Terrible  
Titanic  
Towering  
Tremendous

**Happy**

Cheerful  
Convivial  
Delighted  
Ecstatic  
Intoxicated  
Jolly  
Jubilant  
Mirthful  
Upbeat

**Honest**

Candid  
Authentic  
Equitable  
Ingenuous  
Scrupulous  
Ethical  
Virtuous

**Imminent**

Brewing  
Expectant  
Impending  
Inevitable  
Looming  
Forthcoming

**Inept**

Unskilled  
Awkward  
Clumsy  
Maladroit  
Inadept  
Gauche  
Bungling  
Inexpert

**Inimical**

Harmful  
Hurtful  
Noxious  
Allergic  
Injurious  
Perverse  
Hostile  
Oppugnant  
Nasty

**Insincere**

Deceptive  
Duplicitous  
Perfidious  
Mendacious  
Unctuous

**Inspire**

Encourage  
Stimulate  
Embolden  
Exhilarate  
Galvanize  
Imbue  
Trigger  
Invigorate  
Motivate  
Instill

**Lazy**

Inactive  
Apathetic  
Indolent  
Lackadaisical  
Languid  
Slothful  
Torpid  
Tardy

**Mock**

Ridicule  
Nullify  
Stultify  
Impair

Decay  
Inhibit  
Stifle  
Fester

**New**

Fresh  
Modish  
Novel  
Current  
Fresh

**Number**

Aggregate  
Amount  
Plenitude  
Tally  
Horde

**Old**

Ancient  
Decrepit  
Fossil  
Mature  
Veteran  
Versed  
Seasoned  
Inveterate  
Practiced  
Vintage

**Pallid**

Anemic  
Blanched  
Whitish  
Lackluster  
Spiritless  
Wan  
Pale  
Ashen

**Present**

Existing  
Current  
Instant  
Ad hoc  
Already  
Prompt  
Begun  
Immediate  
Extant  
Just  
now  
started  
Topical  
In process

**Protect**

Assure  
Chaperon  
Cushion  
Defend  
Harbor  
Hedge

**Sacrosanct**

Sacred  
Pious  
Blessed  
Divine  
Deific  
Omniscient  
Celestial  
Theistic  
Eternal

**Sad**

Depressed  
Gloomy  
Dolor

Somber  
Morbid  
Hurting  
Mournful  
Lugubrious  
Grieved  
Pensive  
Cheerless

**Sacrosanct**

Sacred  
Pious  
Blessed  
Divine  
Deific  
Omniscient  
Celestial  
Theistic  
Eternal

**Vex**

Distress  
Abrade  
Chafe  
Exasperate  
Embarrass  
Rile  
Pique

**Worry**

Anguish  
Disquiet  
Distress  
Fear  
Perplexity  
Plague  
Torture  
Torment

# CHAPTER 11

## High Frequency Words

- ABSCOND** : To leave secretly so as to avoid capture, decamp.  
*Usage* : I am stunned that he could **ABSCOND** from the country without falling into the hands of the officials waiting for him at the airport.
- ABATE** : To decline, reduce.  
*Usage* : No amount of pressure from his parents could abate his enthusiasm in choosing journalism as his career.
- ABSTAIN** : Avoid.  
*Usage* : I decided to abstain from eating meat until I recover completely from my illness.
- ABYSS** : Pit, void.  
*Usage* : It is in the deep **ABYSS** of the cave that we found the hidden treasure.
- ADULTERATE** : Depreciate, cheapen.  
*Usage* : As soon as I tasted the food, I knew that it was **ADUTERATED**.
- ADVOCATE** : Encourage, support.  
*Usage* : Robin **ADVOCATES** love for nature.
- AESTHETIC** : Artistic.  
*Usage* : The builder took enough precautions so as not to destroy the **AESTHETIC** appeal of the place.
- AGGRANDIZE** : Augment, increase.  
*Usage* : Do not expect to **AGGRANDIZE** your sales with cheap publicity.

9. **ALLEVIATE** : Lessen.  
*Usage* : I expect that my problems will be ALLEVIATED once I find a suitable job.
10. **AMALGAMATE** : Blend.  
*Usage* : The two overseas branches AMALGAMATED into one in the year 1958.
11. **AMBIGUOUS** : Vague, inconclusive.  
*Usage* : I hate to listen to people who have AMBIGUOUS ideas.
12. **AMELIORATE** : Mitigate, improve.  
*Usage* : The government seems to be doing nothing to AMELIORATE the situation.
13. **ANACHRONISM** : Misdate.  
*Usage* : Her thoughts and behavior surely seemed to be ANACHRONISTIC for a person who is in the prime of her youth.
14. **ANALOGOUS** : Correspondent, akin.  
*Usage* : What you report is not ANALOGOUS to what I have been informed.
15. **ANOMALY** : Abnormality.  
*Usage* : I doubt whether I can correct ANOMALY in her behavior without her help.
16. **ANTAGONIZE** : Oppose.  
*Usage* : The lady ANTAGONIZED the doctor by asking too many silly questions.
17. **ANTIPATHY** : Distaste, dislike.  
*Usage* : I do not have any ANTIPATHY to listening to your point of view.
18. **APATHY** : Aloofness, disregard.  
*Usage* : It is really disheartening when children show APATHY towards their parents.
19. **ARBITRATE** : Conciliate, step in.  
*Usage* : I failed to ARBITRATE between the warring groups.
20. **ARCHAIC** : Very old.  
*Usage* : The ARCHAIC manuscript fell into pieces the moment I touched it.
21. **ARDOR** : Enthusiasm.  
*Usage* : His cold response to my queries did not dampen my ARDOR to continue my search.
22. **ARTICULATE** : Expressive, fluent.  
*Usage* : The judge praised the lawyer for his ARTICULATE argument.
23. **ASSUAGE** : Relieve.  
*Usage* : Sally's father tried to ASSUAGE her but she wept inconsolably.



24. **ATTENUATE** : Abate, debilitate.  
*Usage* : I failed to ATTENUATE the sale of spurious drugs.
25. **AUDACIOUS** : Adventurous.  
*Usage* : The world will surely remember his AUDACIOUS approach to finding solutions to intricate international policies.
26. **AUSTERE** : Strict.  
*Usage* : My family is always at loggerheads with me when I insist on AUSTERE measures.
27. **BANAL** : Ordinary, boring.  
*Usage* : Although the promos were interesting, the movie was BANAL.
28. **BOLSTER** : Assist, boost.  
*Usage* : The doctor BOLSTERED the patient's morale.
29. **BOMBASTIC** : Overblown, pompous.  
*Usage* : The minister's BOMBASTIC claims fell apart when he failed to fulfill even simple things.
30. **CACOPHONY** : Discord, jarring noise.  
*Usage* : We expected symphony but were greeted by a CACOPHONY of sound.
31. **CANDID** : Genuine.  
*Usage* : His CANDID remarks on the failure of government policy were appreciated.
32. **CAPRICIOUS** : Unstable, careless.  
*Usage* : Robert's CAPRICIOUS nature caused him problems with his colleagues.
33. **CASTIGATE** : Berate, chasten.  
*Usage* : Parents are afraid to CASTIGATE their children.
34. **CATALYST** : Impetus.  
*Usage* : The material you found is a good CATALYST and it will cause the expected reaction.
35. **CAUSTIC** : Hurtful, nasty.  
*Usage* : I was shocked to hear the CAUSTIC remarks passed by my principal as I always thought that he was polite.
36. **CHAOS** : Clutter, disorder.  
*Usage* : Sigmund Freud's theories created CHAOS in the society.
37. **CHAUVINIST** : Fanatic.  
*Usage* : Solomon is considered to be a male CHAUVINIST by all his female colleagues.

38. **CHICANERY** : Trickery, cheating.  
*Usage* : After learning about my friend's CHICANERY, I refused to accept his help on face value.
39. **COGENT** : Effective, convincing.  
*Usage* : Oscar has the ability to say something COGENT but unfortunately his brother Donald lacks it.
40. **CONDONE** : Pardon, overlook.  
*Usage* : Compassionate teachers often CONDONE minor errors committed by their students.
41. **CONVOLUTED** : Serpentine, elaborate.  
*Usage* : Her CONVOLUTED approach to solving the problem added to my irritation.
42. **CORROBORATE** : Approve, certify.  
*Usage* : Physical evidence CORROBORATED the witness's testimony.
43. **CREDULOUS** : Simple, trustful.  
*Usage* : Dorothy's CREDULOUS 9-year-old believes that superman is going to help him.
44. **CRESCENDO** : Apex, ascension.  
*Usage* : The CRESCENDO of violence became unbearable and the police had no clue as to how to stop it.
45. **DECORUM** : Conduct, propriety, correctness.  
*Usage* : The soldier who was attending the formal dinner lacked DECORUM.
46. **DEFERENCE** : Respect, courtesy.  
*Usage* : These days youngsters lack DEFERENCE to elders.
47. **DERIDE** : Banter, to mock .  
*Usage* : The politician was DERIDED even by his more popular supporters.
48. **DESICCATE** : Dehydrated.  
*Usage* : DESICCATED coconut is used in this dish to make it tasty.
49. **DIATRIBE** : Abuse, criticism.  
*Usage* : The teacher's DIATRIBE at the student was uncalled for
50. **DESULTORY** : Random, aimless.  
*Usage* : As days passed by, Jade's output became more DESULTORY.
51. **DIFFIDENT** : Hesitant, unconfident.  
*Usage* : Observing the salesman's DIFFIDENT manner, I guessed that the product he was trying to sell was dubious.
52. **DILATE** : Stretch, widen.  
*Usage* : Pupils DILATE when one enters a dark room.

53. **DILATORY** : Backward, delaying.  
*Usage* : The cashier used DILATORY means to stop payment.
54. **DILETTANTE** : Unaccomplished.  
*Usage* : Unlike his father, Roberts is a DILETTANTE in stock-market.
55. **DIRGE** : Elegy, death song.  
*Usage* : Mike wrote a DIRGE for the funeral of his cherished grandfather.
56. **DISABUSE** : Set right.  
*Usage* : The president of the organization DISABUSED critics who didn't understand his new proposal.
57. **DISCERN** : Perceive, descry.  
*Usage* : Randy speaks so convincingly that it is not easy to DISCERN if he is lying.
58. **DISPARATE** : At variance, discordant.  
*Usage* : The details provided by the informer were so DISPARATE that the police were not convinced.
59. **DISSEMBLE** : Disguise, pretend.  
*Usage* : The President was trying to DISSEMBLE rather than present his ideas on the contentious issue.
60. **DISSONANCE** : Disagreement, conflict.  
*Usage* : The electric saws created DISSONANCE in the woods.
61. **DOGMA** : Belief, principle.  
*Usage* : A few managements still hold the DOGMA that satisfaction on the job is not an important criterion.
62. **DUPE** : Cheat.  
*Usage* : Beware of con men lest they should DUPE you of all your earnings
63. **ECLECTIC** : Comprehensive, general.  
*Usage* : The theory is no longer ECLECTIC, it is highly controversial.
64. **EFFICACY** : Ability, productiveness.  
*Usage* : The EFFICACY of the drug is reduced, if it is not taken regularly.
65. **ELEGY** : Complaint, dirge.  
*Usage* : The author wrote an emotional ELEGY about his mother's death.
66. **ELOQUENT** : Ardent, articulate.  
*Usage* : The President gave an ELOQUENT speech in honor of the soldiers who lost their lives defending the country.
67. **EMULATE** : Follow, mimic.  
*Usage* : My son was fascinated by his football coach and tried to EMULATE him.

68. **ENERVATE** : Debilitate, disable.  
*Usage* : Exposure to extreme summer heat ENERVATES one's energy.
69. **ENGENDER** : Arouse, beget.  
*Usage* : Do not ENGENDER fear of dogs among small children.
70. **ENIGMA** : Bewilderment, a mystery.  
*Usage* : Ram's behavior remained an ENIGMA to all his neighbors.
71. **ENUMERATE** : To count, list, or itemize.  
*Usage* : The wife ENUMERATED all her husband's faults during their bitter argument.
72. **EPHEMERAL** : Brief, momentary.  
*Usage* : Running after EPHEMERAL things in life will cost you peace of mind.
73. **EQUIVOCATE** : Vague, ambiguous.  
*Usage* : The witness gave such EQUIVOCAL replies that the jury was confused.
74. **ERRATIC** : Wandering, unpredictable.  
*Usage* : Anny's ERRATIC behavior is a cause for concern.
75. **ERUDITE** : Well educated, cultured.  
*Usage* : Fletcher is the most ERUDITE member of the organization.
76. **ESOTERIC** : Mysterious, obscure.  
*Usage* : The teacher struggled to explain the ESOTERIC terms from the book of philosophy to the class.
77. **ESTIMABLE** : Honorable, worthy.  
*Usage* : Robert's ESTIMABLE work speaks for itself.
78. **EULOGY** : Praise, acclamation.  
*Usage* : David's EULOGY on his father was very touching.
79. **EUPHEMISM** : Delicacy, pretense.  
*Usage* : Sometimes EUPHEMISM is better than speaking the truth.
80. **EXACERBATE** : Aggravate.  
*Usage* : The antacid, EXACERBATED Karen's queasiness, instead of reducing it.
81. **EXCULPATE** : Forgive, acquit.  
*Usage* : The defense attorney tried his best to EXCULPATE his client.
82. **EXIGENT** : Urgent, acute.  
*Usage* : Robert took such a decision under EXIGENT circumstances.

83. **EXONERATE** : Absolve, vindicate.  
*Usage* : The manager was EXONERATED after his secretary had confessed to stealing the important document.
84. **EXPLICIT** : Specific, unambiguous.  
*Usage* : Her EXPLICIT instructions made it easy for me to complete the job on time.
85. **FANATICAL** : Overenthusiastic, immoderate.  
*Usage* : She was so FANATICAL in her beliefs that it was difficult to make her think out of the box.
86. **FAWN** : Flatter.  
*Usage* : Diane FAWNED over the stage manager, hoping to gain a backstage pass for the concert.
87. **FERVID** : Passionate, ardent.  
*Usage* : Grace was FERVID about releasing the book on her father's birthday.
88. **FLORID** : Very elaborate, ornamental.  
*Usage* : Jane's home is decorated in a FLORID style.
89. **FOMENT** : Instigate, provoke.  
*Usage* : The mob tried to FOMENT sentiment against the minister by raising slogans against him.
90. **FRUGALITY** : Moderation, miserliness.  
*Usage* : Due to Claire's FRUGALITY, she was able to save more than half of her take-home pay.
91. **GARRULOUS** : Talkative, blabbermouth.  
*Usage* : GARRULOUS women annoy me.
92. **GREGARIOUS** : Friendly, affable.  
*Usage* : Her GREGARIOUS nature allowed her to gather many friends.
93. **GUILE** : Slyness, craftiness.  
*Usage* : The desperate leader resorted to GUILE in an effort to win support.
94. **GULLIBLE** : Naive, trusting.  
*Usage* : The culprit fooled GULLIBLE women into handing over their ornaments to him.
95. **HOMOGENOUS** : Similar, comparable.  
*Usage* : The members were fairly HOMOGENOUS, in their thoughts, so consensus was not a problem.
96. **ICONOCLAST** : Detractor, dissident.  
*Usage* : The ICONOCLAST in Harry, makes him reject traditional beliefs.

97. **IMPETURBABLE** : Calm, collected.  
*Usage* : The police seemed IMPETURBABLE, even when faced with the wildest problems.
98. **IMPERVIOUS** : Immune, resistant.  
*Usage* : A good roof is IMPERVIOUS to moisture.
99. **IMPETUOUS** : Abrupt, impulsive.  
*Usage* : My father prefers to think through all the options thoroughly, rather than make an IMPETUOUS move.
100. **IMPLACABLE** : Grim, merciless.  
*Usage* : My anger at my subordinate's betrayal left me IMPLACABLE for years.
101. **INCHOATE** : Undeveloped, beginning.  
*Usage* : David has spent a lot of time on his new project but surprisingly it is still INCHOATE.
102. **INGENUOUS** : Honest, truthful.  
*Usage* : She was INGENUOUS by nature, so people fooled her easily
103. **INIMICAL** : Hostile, unfriendly.  
*Usage* : Roger's INIMICAL attitude earned him many enemies.
104. **INNOCUOUS** : Harmless, banal.  
*Usage* : Most of his ideas are INNOCUOUS and pose no danger to us.
105. **INSIPID** : Dull, uninteresting.  
*Usage* : Martin's INSIPID writing fails to generate interest in the readers.
106. **INTRANSIGENT** : Uncompromising, inflexible.  
*Usage* : My children were INTRANSIGENT on the idea of selling the property, and moving to a new place.
107. **INUNDATE** : To overwhelm, drown.  
*Usage* : After the accident, the Helpline was INUNDATED with calls for assistance.
108. **IRASCIBLE** : Angry, irritable.  
*Usage* : Paul's IRASCIBLE nature makes it difficult for me to accept him as my colleague.
109. **LACONIC** : Brief, concise.  
*Usage* : People who know Sara will vouch that she is really not a LACONIC speaker.
110. **LAMENT** : To mourn, to grieve.  
*Usage* : Katy continues to LAMENT the death of her dog.

111. **LAUD** : Praise, acclaim.  
*Usage* : The President LAUDED the success of the space scientists in launching the space craft.
112. **LAVISH** : Profuse, abundant.  
*Usage* : Her LAVISH nature caused many problems to her family.
113. **LETHARGIC** : Sluggish, lethargic.  
*Usage* : Mary felt so LETHARGIC that she decided to skip work.
114. **LOQUACIOUS** : Talkative, verbose.  
*Usage* : At times Lucy's LOQUACIOUS nature was a problem to her family
115. **LUCID** : Evident, obvious.  
*Usage* : The scholar's explanation was so simple and LUCID that we understood every word of it.
116. **LUMINOUS** : Bright, lighted.  
*Usage* : The tourists throng to the place as they are attracted by the fact that there is LUMINOUS sunshine all through the summer.
117. **MALIGN** : Slander, defame.  
*Usage* : No one can MALIGN Hoffman because everyone knows how principled he is.
118. **MALINGER** : Shirk, evade.  
*Usage* : I believed all his excuses for not being regular to work but soon realized that he was a MALINGERER.
119. **MALLEABLE** : Pliable, ductile.  
*Usage* : Some metals are MALLEABLE and can be easily molded.
120. **METICULOUS** : Detailed, exact.  
*Usage* : Michele's METICULOUS work was appreciated by her boss.
121. **MISANTHROPE** : Cynic, Skeptic.  
*Usage* : Scrooge is such a MISANTHROPE that he cannot withstand even children.
122. **MITIGATE** : Abate, Diminish.  
*Usage* : The storm MITIGATED after several hours.
123. **MOLLIFY** : Pacify, Smoothen.  
*Usage* : The worker who was insulted was so angry that no compromise could MOLLIFY him.
124. **MONOTONY** : Boredom, Sameness.  
*Usage* : Music is played in assembly lines to reduce the MONOTONY of repeating the same task.

125. **NAIVE** : Childlike, gullible.  
*Usage* : Although she pretends to be NAIVE, Mary is cunning to the core.
126. **OBDURATE** : Stubborn, unyielding.  
*Usage* : My parents were OBDURATE on the issue, and no amount of persuasion would change their mind.
127. **OBSEQUIOUS** : Complacent, submissive.  
*Usage* : His OBSEQUIOUS nature is not going to help him in achieving good results.
128. **OBSTINATE** : Stubborn, unyielding.  
*Usage* : The OBSTINATE student refused to obey rules in spite of several warnings from the headmaster.
129. **OBVIATE** : Avert, block.  
*Usage* : Please OBVIATE the danger of someone stealing the original document.
130. **OCCLUDE** : Hinder, prevent.  
*Usage* : During a solar eclipse, the light from the sun is OCCLUDED by the moon.
131. **ONEROUS** : Arduous, burdensome.  
*Usage* : The ONEROUS task was completed by the workers without any complaints.
132. **OPAQUE** : Cloudy, muddy.  
*Usage* : The OPAQUE car windows blurred his vision causing an accident.
133. **OPPROBRIUM** : Dishonor, disgrace.  
*Usage* : The home team left the field in OPPOBRIUM after losing such an easy match.
134. **OSTENTATION** : Exhibitionism, pompousness.  
*Usage* : There was an OSTENTATIOUS display of wealth in my friend's wedding.
135. **PARADOX** : Contradiction, dilemma.  
*Usage* : In a sad PARADOX, those most in need of medical attention are least able to obtain it.
136. **PARAGON** : Outstanding example.  
*Usage* : Miss America is the PARAGON of beauty, intelligence, talent and fitness.
137. **PEDANT** : Dogmatist.  
*Usage* : The scientist is known to be a PEDANT.



138. **PERFIDIOUS** : Betraying, deceptive.  
*Usage* : Amina's PERFIDIOUS nature astonished her boyfriend as he had trusted her fully.
139. **PERFUNCTORY** : Automatic, unthinking.  
*Usage* : Sara's PERFUNCTORY smile brightened her face.
140. **PERMEATE** : Filter, diffuse.  
*Usage* : The sweet smell of her perfume PERMEATED through the entire room.
141. **PHILANTHROPY** : Altruism, love of mankind.  
*Usage* : Charity institutions owe most of their working capital to the PHILANTHROPY of private citizens in the community.
142. **PLACATE** : Pacify, calm.  
*Usage* : My mother tried to PLACATE my sister's anger by offering her food to eat.
143. **PLASTIC** : Made of plastic.  
*Usage* : In this city it is mandatory not to use PLASTIC bags.
144. **PLETHORA** : Excess, plenty.  
*Usage* : His PLETHORA of desires will take him nowhere.
145. **PRAGMATIC** : Sensible, practical.  
*Usage* : PRAGMATIC people oppose idealism.
146. **PRECIPITATE** : Hurry, speed.  
*Usage* : The governor's extramarital affair PRECIPITATED his ouster.
147. **PREVARICATE** : Distort, evade.  
*Usage* : The student PREVARICATED to avoid being punished by his teacher.
148. **PRISTINE** : Clean, pure.  
*Usage* : Jane was awestruck when she saw the PRISTINE mountains.
149. **PRODIGAL** : Lavish, wasteful.  
*Usage* : The PRODIGAL son wasted his inheritance on a decadent lifestyle.
150. **PROLIFERATE** : Breed, multiply.  
*Usage* : National security is on stake when the belligerent neighbor decides to PROLIFERATE nuclear weapons.
151. **PROPITIATE** : Satisfy, pacify.  
*Usage* : The government PROPITIATED the irate public by agreeing to step up safety measures.
152. **PROPRIETY** : Correct behavior, obedience to rules and customs.  
*Usage* : My grandmother maintained a high level of PROPRIETY, adhering to dozens of social rules.

153. **PRUDENCE** : Care, caution, or restraint.  
*Usage* : The widow's PRUDENCE helped her to carefully manage her finances.
154. **PUNGENT** : Acidic, bitter.  
*Usage* : Her PUNGENT remarks left me shocked.
155. **QUIESCENT** : Motionless, inactive.  
*Usage* : This month seems to be relatively QUIESCENT in terms of the agitation.
156. **RAREFY** : Thin, decrease.  
*Usage* : To RAREFY the foul air, spray some room freshener.
157. **REPUDIATE** : Reject, abjure.  
*Usage* : The woman's paternity suit was REPUDIATED when her accusations were proven wrong.
158. **RETICENT** : Silent, reserved.  
*Usage* : John finds it difficult to adjust in huge crowd because he is RETICENT.
159. **RHETORIC** : Wordiness, verbosity.  
*Usage* : Clara's RHETORIC left the gathering bored.
160. **SATIATE** : Satisfy, overdose.  
*Usage* : I realized that nothing could SATIATE James's greed for money.
161. **SOPORIFIC** : Sleepy, drowsy.  
*Usage* : The SOPORIFIC drug when consumed left most people sleepy.
162. **SPECIOUS** : Misleading, deceptive.  
*Usage* : Jill's SPECIOUS excuses did not convince her teacher.
163. **STIGMA** : Shame, disgrace.  
*Usage* : As progressive as we seem, there is still a STIGMA against single motherhood.
164. **STOLID** : Unemotional, apathetic.  
*Usage* : Sally's boss remained STOLID and unaffected in spite of her pathetic appeals not to penalize her.
165. **SUBLIME** : Great, magnificent.  
*Usage* : The SUBLIME surroundings complemented the peaceful mood of the visitors.
166. **TACIT** : Allusive, implicit.  
*Usage* : The group made a TACIT agreement about which course of action to take.

167. **TACITURN** : Silent, not talkative.  
*Usage* : My neighbor is so TACITURN that he rarely speaks to us.
168. **TIRADE** : Abuse, outburst.  
*Usage* : The man's nonstop TIRADE over such a minor issue irritated all of us.
169. **TORPOR** : Lethargy, sluggishness.  
*Usage* : After the accident, for many days I experienced TORPOR and my wife was worried about it.
170. **TRANSITORY** : Temporary, momentary.  
*Usage* : The student lived a TRANSITORY life, moving almost every semester.
171. **VACILLATE** : Hesitate, indecisive.  
*Usage* : I hate people who VACILLATE after announcing their decision.
172. **VENERATE** : Revere, admire.  
*Usage* : In China, the young VENERATE the elders.
173. **VERACITY** : Truth, accuracy.  
*Usage* : The paper's reputation for VERACITY made everyone trust its version of news.
174. **VERBOSE** : Wordy, prolix.  
*Usage* : The manager's lecture was so VERBOSE that the workers did not understand what he was trying to say.
175. **VEX** : Distress, bother.  
*Usage* : The husband was VEXED with his wife's cooking mishaps.
176. **VOLATILE** : Changeable, mercurial.  
*Usage* : The metal's VOLATILE feature makes it less effective.
177. **WAVER** : Fluctuate, oscillate.  
*Usage* : The government WAVERED between accepting and rejecting the mission.
178. **WHIMSICAL** : Playful, fanciful.  
*Usage* : I do not like your WHIMSICAL attitude on such an important issue.
179. **ZEAL** : Passion, excitement.  
*Usage* : Her ZEAL for work is unimaginable.
180. **ZENITH** : Top, apex.  
*Usage* : The climax reached its ZENITH and the spectators were holding their breath in anticipation.

# CHAPTER 12

## Word List

1. **abandon** (verb)

*We decided to ABANDON the ship as it developed a hole.*

**Synonyms:** back out, desert, disown, forsake, jilt, leave, leave behind, quit, reject, renounce, throw over, walk out on.

**Antonyms:** adopt, assert, favor, uphold.

2. **abhor** (verb)

*I advised Randy not to ABHOR animals.*

**Synonyms:** abominate, be allergic to, be down on, be grossed out by, despise, detest, hate, have no use for, loathe, scorn.

**Antonyms:** admire, adore, approve, cherish, desire, enjoy, like, love, relish.

3. **abjure** (noun)

*The new government made an announcement to ABJURE all controversies related to corruption.*

**Synonyms:** abstain from, forswear, recant, renege, renounce, retract, take back, withdraw.

**Antonyms:** agree, aid, allow, approve, assent, assist, concur, consent, endorse, help, permit, uphold.

4. **accountable** (adjective)

*Sam always holds his parents ACCOUNTABLE for all his mishaps.*

**Synonyms:** answerable, charged with, culpable, liable, obligated, obliged, on the hook.

**Antonyms:** blameless, innocent, irresponsible, unaccountable, unreliable, untrustworthy.

5. **acerbic** (adjective)

*I was stunned to hear the ACERBIC remarks of my manager.*

**Synonyms:** acidic, acrid, astringent, caustic, harsh, sharp, tart.

**Antonyms:** basically kind, nice.

**6. acquiesce** (*verb*)

*My son ACQUIESCED in the plans I had made for him.*

**Synonyms:** accede, accept, accommodate, adapt, adjust, agree, allow, approve, bow to, buy, cave in, come across, come around, comply, concur, conform, consent, cut a deal, give in, reconcile, submit, subscribe, yield.

**Antonyms:** disagree, dissent, object, protest.

**7. acquit** (*verb*)

*The defense council's argument was so effective that the jury members had no choice but to ACQUIT the criminal.*

**Synonyms:** absolve, blink at, clear, deliver, discharge, exculpate, excuse, exonerate, free, let go, let off, let off the hook, liberate, release, relieve, vindicate.

**Antonyms:** blame, censure, condemn, convict, damn, denounce, doom, sentence.

**8. acrimonious** (*adjective*)

*Even people who supported the minister could not appreciate his ACRIMONIOUS remarks against the opposition leader.*

**Synonyms:** acerbic, acidic, angry, astringent, belligerent, biting, bitter, caustic, censorious, churlish, crabby, cranky, cross, cutting, indignant, irascible, irate, ireful, mad, mordant, peevish, petulant, rancorous, sarcastic, sharp, spiteful, splenetic, tart, testy, trenchant, wrathful.

**Antonyms:** kind, kindly, peaceable.

**9. acute** (*adjective*)

*My grandmother is nearing 90 years, yet she has very ACUTE hearing.*

**Synonyms:** astute, canny, clever, discerning, discriminating, incisive, ingenious, insightful, intense, intuitive, judicious, keen, observant, penetrating, perspicacious, piercing, quick-witted, sensitive, sharp, smart, subtle.

**Antonyms:** dense, imperceptive, insensitive, obtuse, slow, stupid.

**10. adamant** (*adjective*)

*It is very difficult to get along with my boss who is ADAMANT.*

**Synonyms:** determined, firm, fixed, hanging tough, immovable, inexorable, inflexible, insistent, intransigent, obdurate, relentless, resolute, rigid, set, stiff, stubborn, unbendable, unbending, uncompromising, unrelenting, unshakable, unswayable.

**Antonyms:** flexible, pliant, submissive, yielding.

**11. addicted** (*adjective*)

*The present generation is ADDICTED to watching television.*

**Synonyms:** absorbed, accustomed, attached, dependent, devoted, disposed, fanatic, fond, habituated, hooked, hyped, imbued, inclined, obsessed, predisposed.

**Antonyms:** disinclined, independent, opposed, unaccustomed.

**12. admonish** (*verb*)

*I felt insulted when my boss ADMONISHED me for not being punctual.*

**Synonyms:** advise, berate, censure, check, chide, counsel, enjoin, rap, rebuke, reprimand, reprove, scold, upbraid, warn.

**Antonyms:** applaud, approve, commend, compliment, extol, flatter, laud, praise.

**13. adroit** (adjective)

*Even his critics could not stop from praising Randy for his ADROIT replies.*

**Synonyms:** adept, apt, artful, clean, clever, cunning, cute, deft, dexterous, expert, good, handy, ingenious, masterful, proficient, quick-witted, savvy, sharp, skillful, slick, smart, wizard.

**Antonyms:** awkward, clumsy, dense, inept, stupid, unskilled.

**14. adverse** (adjective)

*The ADVERSE remarks published in the press marked the beginning of Glory's political downfall.*

**Synonyms:** allergic to, conflicting, contrary, detrimental, disadvantageous, inimical, injurious, inopportune, negative, opposed, reluctant, repugnant, stuffy, unfortunate, unfriendly, unlucky, unpropitious, unwilling.

**Antonyms:** advantageous, aiding, favorable, fortunate, helpful, lucky, propitious.

**15. advocate** (verb)

*At the international summit developed countries decided to ADVOCATE nuclear proliferation and reduction in military expenditure.*

**Synonyms:** back, condone, egg on, encourage, endorse, goad, incite, instigate, prod, promote, provoke, sanction, spur, support, urge.

**Antonyms:** counter, deter, discourage, frustrate, hinder, hurt, impede, obstruct, resist.

**16. affable** (adjective)

*Her AFFABLE nature has won her many friends.*

**Synonyms:** amiable, amicable, approachable, benevolent, benign, civil, congenial, cordial, courteous, genial, gentle, gracious, kindly, pleasant, polite, sociable, urbane, warm.

**Antonyms:** complaining, disdainful, grouchy, grumbling, impolite, miserable, reserved, surly, unfriendly.

**17. afflict** (verb)

*After I returned from Africa, I was AFFLICTED with malaria.*

**Synonyms:** agonize, annoy, burden, distress, grieve, harass, harrow, harry, irk, lacerate, martyr, oppress, pain, pester, plague, press, rack, smite, strike, torment, torture, trouble, try, vex, worry, wound.

**Antonyms:** aid, comfort, help, solace, stay away from, take care of.

**18. affluent** (adjective)

*I always dreamt of leading an AFFLUENT life.*

**Synonyms:** copious, diffuse, effusive, exaggerated, excessive, fecund, fertile, fruitful, fulsome, lavish, lush, luxuriant, opulent, overdone, overflowing, plenteous, plentiful, prodigal, prolific, rampant, rich, riotous, superabundant, superfluous, teeming.

**Antonyms:** destitute, impoverished, needy, penniless, poor.

**19. aggravate** (verb)

*Grant was facing economic problems and his huge loss in business AGGRAVATED his situation further.*

**Synonyms:** bother, bug, dog, exasperate, get to, give a hard time, grate, irritate, nag, needle, nettle, peeve, pester, pick on, pique, provoke, tease, vex.

**Antonyms:** appease, gladden, make happy, mollify, soften.

**20. agonize** (verb)

*I do not want to AGONIZE over such a trivial issue.*

**Synonyms:** afflict, bleed, carry on, crucify, distress, disturb, eat heart out, excruciate, harrow, hurt, labor, lament, martyr, pain, rack, sing the blues, squirm, stew over, strain, strive, struggle, take it badly, torment, torture, try, wince, worry, writhe.

**Antonyms:** not to worry.

**21. alienate** (*verb*)

James ALIENATED even his ardent supporters by passing the controversial immigration bill.

**Synonyms:** break off, come between, disaffect, disunite, divide, divorce, estrange, make indifferent, part, separate, set against, turn away, turn off, wean.

**Antonyms:** be friendly, disarm.

**22. alleviate** (*verb*)

My mother's soothing words ALLEVIATED my sorrow to a great extent.

**Synonyms:** allay, assuage, ease, lighten, mitigate, mollify, pacify, pour oil on, soft-pedal.

**Antonyms:** aggravate, heighten, increase, intensify, magnify.

**23. allude** (*verb*)

Although Roger did not speak about Sandy, we knew that he was ALLUDING to her.

**Synonyms:** advert, bring up, imply, insinuate, intimate, point, refer, suggest.

**Antonyms:** conceal, hide, withhold.

**24. altruism** (*noun*)

Liza's ALTRUISM is unbelievable; her unselfishness is incomparable.

**Synonyms:** benevolence, charity, humanitarianism, kindness, magnanimity, philanthropy, public spirit, selflessness, social conscience.

**Antonyms:** malevolence, uncharitableness, unkindness.

**25. ambiguous** (*adjective*)

From Daniel's AMBIGUOUS answers, it is clear that he did not understand the basic concept.

**Synonyms:** cryptic, doubtful, dubious, enigmatic, equivocal, inconclusive, indefinite, indeterminate, implicit, obscure, opaque, puzzling, tenebrous, uncertain, unclear, unintelligible, vague.

**Antonyms:** certain, definite, exact, sure.

**26. ameliorate** (*verb*)

The new roads will AMELIORATE traffic conditions and help fast movement.

**Synonyms:** alleviate, amend, help, improve, lighten, mitigate, relieve, step up, upgrade.

**Antonyms:** handicap, harm, hinder, hurt, injure, worsen.

**27. amorphous** (*adjective*)

The audience failed to understand his AMORPHOUS ideas.

**Synonyms:** characterless, formless, inchoate, indeterminate, irregular, nebulous, nondescript, shapeless, unformed, unshaped, unstructured, vague.

**Antonyms:** definite, distinct, distinctive, shaped, shapely.

**28. anathema** (*noun*)

It is hard to describe Larry's ANATHEMA to football.

**Synonyms:** abomination, bane, bugbear, detestation, enemy, hate.

**Antonyms:** beauty, blessing, delight, enjoyment, esteem, joy, love, treat.

**29. anomaly** (*noun*)

The ANOMALY of the situation is that Roger knows that his wife is the culprit but he cannot inform the police.

**Synonyms:** aberration, abnormality, departure, deviation, eccentricity, exception, incongruity, inconsistency, irregularity, oddity, peculiarity, rarity, unconformity, unorthodoxy.

**Antonyms:** conformity, normality, regularity, standard, usual.

**30. antiquated** (*adjective*)

Glory and her ANTIQUATED ideas are always a butt of joke in my office.

**Synonyms:** aged, ancient, antediluvian, antique, archaic, dated, elderly, fusty, hoary, moldy, obsolescent, old, old hat, old-fashioned, old-fashioned, out-of-date, outmoded, outworn, superannuated.

**Antonyms:** forward-looking, modern, new, recent.

**31. apathetic** (*adjective*)

The detectives concerned remained APATHETIC even after the mission failed.

**Synonyms:** callous, cold, cool, emotionless, flat, impassive, indifferent, insensible, languid, passive, stoic, stolid, unconcerned, unemotional, unfeeling, uninterested, unmoved, unresponsive, untouched.

**Antonyms:** caring, concerned, interested, responsive.

**32. approbation** (*noun*)

The actor received unprecedented APPROBATIONS for his performance in the new release.

**Synonyms:** admiration, approval, bells, consent, endorsement, esteem, favor, go-ahead, high regard, approval, permission, recognition, sanction, support, the nod.

**Antonyms:** criticism, disapprobation.

**33. arbitrate** (*verb*)

I failed miserably to ARBITRATE between the clashing groups.

**Synonyms:** adjudge, adjudicate, adjust, conciliate, interpose, intervene, judge, mediate, negotiate, parley, placate, reconcile, referee, settle, smooth, soothe.

**Antonyms:** differ, disagree, dispute, dissent, quarrel.

**34. arduous** (*adjective*)

The child's ARDUOUS appeals fell deaf on the ears of his master.

**Synonyms:** exhausting, fatiguing, formidable, heavy, labored, onerous, painful, punishing, rigorous, severe, strenuous, taxing, tiring, toilsome, troublesome, trying.

**Antonyms:** easy, facile, motivating.

**35. arrant** (*adjective*)

His ARRANT behavior left his parents shocked.

**Synonyms:** absolute, blatant, glaring, notorious, out-and-out, unmitigated, unregenerate.

**Antonyms:** inconspicuous, quiet, unpronounced.

**36. articulate** (*verb*)

Although the parents seem to be confused, their son is very ARTICULATE.

**Synonyms:** clear, coherent, comprehensible, definite, distinct, eloquent, expressive, fluent, intelligible, lucid, meaningful, understandable, well-spoken.

**Antonyms:** misrepresented, unclear, unintelligible.

**37. ascetic** (*adjective*)

Ever since Roger lost his wife, he has been leading an ASCETIC life.

**Synonyms:** spartan, abstaining, abstemious, abstinent, austere, disciplined, puritanical, strict.

**Antonyms:** friendly, fun-loving, participating, sociable.



**38. aspersion** (*noun*)

*In spite of his sincere work, James' manager cast ASPERSIONS on him.*

**Synonyms:** abuse, backbiting, calumny, defamation, detraction, invective, obloquy, rap, slander, smear, vituperation.

**Antonyms:** calmness, happiness, kindness, mildness.

**39. assuage** (*verb*)

*My father tried to ASSUAGE my feelings with some encouraging words.*

**Synonyms:** allay, alleviate, appease, calm, compose, conciliate, ease, fill, lessen, lighten, lull, mitigate, moderate, mollify, pacify, palliate, placate, propitiate, quench, quiet, satisfy, soften, temper.

**Antonyms:** exacerbate, upset.

**40. atrophy** (*verb*)

*Sally's prolonged illness left her ATROPHIED and her doctor warned her that it could be dangerous.*

**Synonyms:** decline, degeneracy, degeneration, deterioration, diminution, downfall, downgrade.

**Antonyms:** build, develop, flourish, germinate, grow, improve, ripen, strengthen.

**41. babble** (*verb*)

*The audience failed to understand the guest speaker because he BABBLED.*

**Synonyms:** burble, chatter, clamor, drivel, gibberish, gossip, idle talk, jabber, jabbering, jargon, murmur, muttering, prattle, ranting, tattling.

**Antonyms:** quiet, sense, wisdom.

**42. badger** (*verb*)

*Fletcher BADGERED us into going on a boat ride.*

**Synonyms:** annoy, bait, bug, bully, give the business, goad, harass, harry, hassle, heckle, hound, importune, insist on, needle, nudge, pester, plague, ride, tease, torment.

**Antonyms:** leave alone.

**43. badinage** (*noun*)

*Although my son is twenty, he never stops his BADINAGE even while discussing serious issues.*

**Synonyms:** banter, fool, joking, joshing, kidding, persiflage, raillery, repartee, ribbing, teasing.

**Antonyms:** depression, drama, sadness, seriousness, tragedy, unhappiness.

**44. baffle** (*verb*)

*I admitted to my boss that stock market BAFFLES me, so I avoid investing in shares.*

**Synonyms:** addle, amaze, astound, befuddle, bewilder, buffalo, confound, confuse, daze, disconcert, dumbfound, elude, embarrass, muddle, mystify, nonplus, puzzle, rattle, stump, stun, throw.

**Antonyms:** clear up, enlighten, explain.

**45. baleful** (*adjective*)

*The jury was perturbed when they noticed the criminal's BALEFUL look.*

**Synonyms:** calamitous, deadly, dire, evil, foreboding, harmful, hurtful, injurious, malevolent, malignant, noxious, ominous, pernicious, ruinous, sinister, threatening, venomous, vindictive, woeful.

**Antonyms:** advantageous, auspicious, favorable, good, helping, promising.

**46. banal** (*adjective*)

The **BANAL** performance of the actor left his fans disappointed.

**Synonyms:** bland, clichéd, common, conventional, dumb, everyday, flat, hackneyed, insipid, mundane, ordinary, pabulum, pedestrian, platitudinous, square, stale, stereotyped, trite, unimaginative, unoriginal, vapid.

**Antonyms:** abnormal, extraordinary, infrequent, noteworthy, rare, scarce, uncommon, unusual, valuable, fresh, new, original.

**47. baneful** (*adjective*)

Television has a **BANEFUL** influence on children.

**Synonyms:** baleful, calamitous, deadly, deleterious, destructive, disastrous, evil, fatal, harmful, hurtful, malefic, noxious, pernicious, pestilent, pestilential, poisonous, venomous, wicked.

**Antonyms:** advantageous, beneficial, beneficent, fortunate, helpful, lucky.

**48. banish** (*verb*)

The committee decided to **BANISH** the controversial members from attending all future meetings.

**Synonyms:** ban, cast out, deport, discard, discharge, dislodge, dismiss, dispel, drive away, eliminate, eradicate, evict, exclude, excommunicate, exile, expatriate, ostracize, oust, outlaw, proscribe, relegate, remove, rusticate, sequester, shake off, shut out.

**Antonyms:** accept, allow, ask in, permit, welcome.

**49. beguile** (*verb*)

Do not try to **BEGUILE**; I know you are a cheat.

**Synonyms:** betray, bluff, cheat, deceive, delude, dupe, entice, exploit, finesse, juggle, lure, manipulate, mislead, rook, rope in, scam, seduce, trick.

**Antonyms:** deter, discourage, dissuade, prevent, repel, threaten, turn off, warn.

**50. belie** (*verb*)

My son's poor performance in the entrance exam **BELIED** my hope of seeing him as a doctor.

**Synonyms:** confute, contradict, contravene, controvert, deny, disaffirm, disagree, explode, gainsay, negate, negative, oppose, repudiate.

**Antonym:** attest, prove.

**51. belittle** (*verb*)

Sam's sincere efforts were **BELITTLED** by his friends.

**Synonyms:** bad-mouth, blister, criticize, decry, deprecate, depreciate, deride, derogate, diminish, discount, discredit, disparage, dispraise, downgrade, downplay, lower, minimize, scoff at, smear, sneer at, squash, squelch, take a swipe at, tear down, underestimate, underrate, undervalue, write off.

**Antonym:** buildup, praise, exaggerate.

**52. belligerent** (*adjective*)

My **BELLIGERENT** neighbor became unusually quiet after he lost his son in an accident.

**Synonyms:** aggressive, antagonistic, ardent, at loggerheads, battling, bellicose, cantankerous, combative, contentious, fierce, fighting, flip, hostile, hot, hot-tempered, mean, militant, pugnacious, quarrelsome, scrappy, truculent, warlike.

**Antonyms:** cooperative, helping, kind, nice.

**53. berserk** (*adjective*)

*My mom went BERSERK when I broke her china glass.*

**Synonyms:** crazy, demented, deranged, insane, mad, maniacal, manic, violent.

**Antonyms:** sane.

**54. blatant** (*adjective*)

*Harry's BLATANT disregard to his work is terribly annoying.*

**Synonyms:** arrant, bald, barefaced, brassy, clear, conspicuous, crying, flagrant, flashy, flaunting, garish, gaudy, glaring, glitzy, impudent, loud, meretricious, naked, obtrusive, ostentatious, outright, overbold, overt, plain, prominent, pronounced, protrusive, screaming, shameless, sheer, showy, snazzy, unabashed, unblushing, unmitigated.

**Antonyms:** inconspicuous, quiet, subtle, unpronounced.

**55. boggle** (*verb*)

*It is not necessary to BOGGLE myself with work as I am a retired person now.*

**Synonyms:** amaze, astound, bowl over, overwhelm, shock, startle.

**Antonyms:** accomplish, achieve, do well, succeed.

**56. bowdlerize** (*verb*)

*It is not the publisher's duty to BOWDLERIZE the unwanted parts of a book; it is the editor's duty*

**Synonyms:** edit, expurgate, redact, clean up, cleanse, decontaminate, lustrate, purge, purify, sanitize, screen, scrub, squash, sterilize.

**Antonyms:** allow, permit.

**57. brutal** (*adjective*)

*Everyone was shocked to hear about the BRUTAL murder in the neighborhood.*

**Synonyms:** barbarous, bloodthirsty, callous, ferocious, gruff, hard, harsh, heartless, impolite, inhuman, insensitive, merciless, pitiless, remorseless, rough, rude, ruthless, savage, severe, uncivil, uncivilized, unfeeling, unmannerly, unmerciful, vicious.

**Antonyms:** generous, humane, kind, nice.

**58. bungle** (*verb*)

*I believed that my secretary would arrange everything but she BUNGLED.*

**Synonyms:** boggle, botch, butcher, err, flub, foul up, fudge, fumble, goof up, gum up, louse up, make a mess of, mar, mess up, miscalculate, mishandle, mismanage, muff, ruin, screw up, spoil.

**Antonyms:** do well, fix, manage, succeed.

**59. burnish** (*verb*)

*The silver plate shined brightly after it was BURNISHED.*

**Synonyms:** buff, furbish, glaze, gloss, luster, sheen, shine.

**Antonyms:** dull, tarnish.

**60. burgeon** (*verb*)

*His small company soon BURGEONED into a big one because of his hard work.*

**Synonyms:** blossom, bud, expand, flower, grow, increase, mushroom, prosper, snowball, sprout, thrive.

**Antonyms:** shrink, shrivel, wither.

**61. bustle** (*verb*)

Unlike Andrew, Daniel enjoys **BUSTLE** around him.

**Synonyms:** activity, agility, alacrity, alertness, animation, business, commotion, dash, deal, energy, enterprise, flurry, force, functioning, game, going, happening, haste, hopper, in the works, industry, life, liveliness, motion, movement, occupation, operation, plan, power, process, proposition, racket, reaction, response, rush, scene, spirit, stir, stunt, trip, turmoil, vigor, vim, vitality, vivacity.

**Antonyms:** cessation, idleness, inaction, inactivity, inertia, repose, rest, stoppage.

**62. cacophonious** (*adjective*)

The workers were too **CACOPHONOUS** to listen to the management's explanation.

**Synonyms:** clinking, discordant, disharmonic, dissonant, grating, ill-sounding, immusical, inharmonious, jangly, jarring, noisy, raucous, sour, strident, unmusical.

**Antonyms:** concordant, harmonious, quiet.

**63. cajole** (*verb*)

Gracy was at last **CAJOLED** into giving up her idea about becoming a nun.

**Synonyms:** argue into, banter, beguile, blandish, deceive, decoy, delude, dupe, entice, induce, influence, inveigle, jolly, lay it on thick, lure, maneuver, soap, soft-soap, soften, sweet-talk, sweeten up, tantalize, tempt, urge, wheedle, work on, work over.

**Antonyms:** bully, force, repel.

**64. callous** (*adjective*)

Samuel's sufferings are only because of his **CALLOUS** attitude to life.

**Synonyms:** apathetic, careless, cold, hardhearted, heartless, impassive, impenitent, indifferent, insensitive, inured, obdurate, soulless, spiritless, torpid, tough, toughened, unaffected, unbending, uncaring, uncompassionate, unconcerned.

**Antonyms:** compassionate, feeling, kind, nice, sensitive, sympathetic, tender.

**65. candour** (*noun*)

The entire family recognizes Peter's **CANDOR** and appreciates his effort in keeping them happy.

**Synonyms:** artlessness, directness, fairness, forthrightness, frankness, guilelessness, honesty, impartiality, ingenuousness, naiveté, openness, outspokenness, probity, simplicity, sincerity, straightforwardness, truthfulness, uprightness, veracity.

**Antonyms:** artifice, deception, falsehood, guile, lying.

**66. capricious** (*adjective*)

It is hard to believe Greg because by nature he is **CAPRICIOUS**.

**Synonyms:** arbitrary, careless, changeful, contrary, effervescent, erratic, fanciful, fickle, fitful, flighty, impulsive, mercurial, moody, queer, quirky, temperamental, ticklish, unpredictable, unreasonable, unstable, variable, volatile, wayward, whimsical.

**Antonyms:** constant, dependable, sensible, staid, steadfast, steady.

**67. celerity** (*noun*)

The job needs **CELERITY**; only youngsters are eligible.

**Synonyms:** alacrity, briskness, dispatch, expedition, expeditiousness, fleetness, gait, haste, hurry, hustle, legerity, promptness, quickness, rapidity, speed, speediness, swiftness, velocity, vivacity.

**Antonyms:** slowness, sluggishness.

**68. chagrin** (*noun*)

*My friend's CHAGRIN of not making to the top rank is understandable; he put in a lot of study.*

**Synonyms:** annoyance, balk, blow, crushing, discomfiture, discomposure, disgruntlement, dismay, disquiet, dissatisfaction, embarrassment, fretfulness, frustration, humiliation, ill-humor, irritation, letdown, mortification, peevishness, shame, spleen, upset, vexation.

**Antonyms:** delight, gladness, joy, pleasure, triumph.

**69. charismatic** (*adjective*)

*To win the election, the leader has to be CHARISMATIC.*

**Synonyms:** alluring, appealing, hypnotic, larger than life, magnetic, mesmerizing, poised.

**Antonyms:** apathetic, boring, dull, inactive, passive, unexciting.

**70. chide** (*verb*)

*I CHIDED my daughter for not keeping the doctor's appointment.*

**Synonyms:** berate, blame, castigate, censure, check, condemn, lesson, monish, rate, rebuke, reprehend, reprimand, reproach, reprove, scold, slap on the wrist, speak to, take down a peg, talk to, tell off, tick off, upbraid.

**Antonyms:** compliment, laud, praise.

**71. circumspect** (*adjective*)

*I am shocked he agreed to try the new idea; he is usually very CIRCUMSPECT.*

**Synonyms:** attentive, cagey, calculating, canny, careful, chary, considerate, deliberate, discriminating, gingerly, guarded, heedful, judicious, meticulous, observant, politic, prudent, punctilious, safe, sagacious, sage, scrupulous, vigilant, wary, watchful.

**Antonyms:** audacious, bold, careless, incautious, indiscreet, rash.

**72. circumvent** (*verb*)

*In order to CIRCUMVENT the police, he adopted a very clever disguise.*

**Synonyms:** avoid, beat, beguile, bypass, circumnavigate, deceive, detour, disappoint, dodge, dupe, elude, ensnare, entrap, escape, evade, foil, frustrate, hoodwink, prevent, queer, ruin, shun, stave off, steer clear of, stump, stymie, thwart, trick, ward off.

**Antonyms:** aid, allow, assist, help, permit.

**73. clamor** (*verb*)

*My dogs constantly CLAMOR for my attention.*

**Synonyms:** agitation, clinker, complaint, convulsion, hassle, lament, noise, outcry, pandemonium, protesting, racket, remonstrance, row, ruckus, shout, tumult, turmoil, upheaval, uproar, vociferation.

**Antonyms:** quiet, silence.

**74. cloistered** (*adjective*)

*She always leads a CLOISTERED life and hardly comes out of her shell to meet people.*

**Synonyms:** cloistral, confined, hermitic, hidden, insulated, recluse, reclusive, restricted, sequestered, sheltered, shielded, shut off, withdrawn.

**Antonyms:** free, open.

**75. cognizant** (*adjective*)

Terry was fully *COGNIZANT* of his responsibility, so he cannot blame anyone now.

**Synonyms:** acquainted, alive, apprehensive, au courant, awake, conscious, familiar, grounded, informed, judicious, knowing, knowledgeable, observant, perceptive, plugged in, savvy, sensible, sentient, versed.

**Antonyms:** ignorant, unaware, unfamiliar, unwitting.

**76. colossal** (*adjective*)

All the buildings in the new city are *COLOSSAL*.

**Synonyms:** cyclopean, elephantine, enormous, gargantuan, giant, gigantic, huge, humongous, immense, jumbo, mammoth, monstrous, mountainous, super, titanic, vast.

**Antonyms:** small, teeny, tiny.

**77. commiserate** (*verb*)

I *COMMISERATED* with my son after he failed to get a job even after trying repeatedly.

**Synonyms:** ache, compassionate, condole, console, feel, feel for, have mercy, pity, share sorrow, sympathize.

**Antonyms:** be indifferent, turn away.

**78. compatible** (*adjective*)

Unless you find time for your family, your life will not be *COMPATIBLE*.

**Synonyms:** accordant, adaptable, appropriate, congenial, congruent, congruous, consistent, consonant, cooperative, harmonious, meet, proper, reconcilable, suitable, sympathetic, together.

**Antonyms:** antagonistic, antipathetic, disagreeable, incompatible, inharmonious, unsuitable, unsuited.

**79. complacency** (*noun*)

I hate *COMPLACENCY* in matters of importance.

**Synonyms:** satisfaction, security, smugness.

**Antonyms:** humility, meekness, modesty, self-consciousness, shyness, timidity.

**80. contrite** (*adjective*)

He misbehaves with his parents but has no *CONTRITE* for his actions.

**Synonyms:** apologetic, attritional, chastened, compunctious, conscience-stricken, humble, penitent, penitential, remorseful, repentant, sorrowful, sorry.

**Antonyms:** hurtful, indifferent, mean.

**81. covetous** (*adjective*)

I warned Goldy many times on her *COVETOUS* nature.

**Synonyms:** acquisitive, avaricious, avid, eager, envious, grabby, grasping, green-eyed, grudging, hogging, itchy, jealous, keen, mercenary, piggish, rapacious, ravenous, selfish, voracious, yearning.

**Antonyms:** benevolent, generous, giving.

**82. dabble** (*verb*)

Although painting is a new task, I decided to *DABBLE* with it.

**Synonyms:** flirt with, horse around, idle, trifle, trifle with, work superficially.

**Antonyms:** take seriously.

**83. daunt** (*verb*)

I never feel *DAUNTED* even when I face the most stressful situation.

**Synonyms:** bully, consternate, cow, deter, discourage, dishearten, dismay, dispirit, foil, horrify, intimidate, overawe.

**Antonyms:** encourage, hearten, help, incite, inspirit, stimulate, urge.

**84. debase** (*adjective*)

All the imitation goods that have flooded the market have **DEBASED** the value of genuine goods.

**Synonyms:** disable, disgrace, dishonor, drag down, dump on, enfeeble, humble, humiliate, lower, put away, put down, reduce, sap, sink, undermine, weaken.

**Antonyms:** laud, praise, upgrade, value.

**85. debilitate** (*verb*)

After his serious illness, he felt **DEBILITATED**.

**Synonyms:** eviscerate, exhaust, extenuate, harm, hurt, injure, mar, blunt, cripple, devitalize, disable.

**Antonyms:** cure, energize, help, invigorate, mend, strengthen.

**86. decadent** (*adjective*)

His **DECADENT** behavior is not acceptable to any of the trustee members.

**Synonyms:** depraved, dissolute, evil, gone bad, immoral, lost, moribund, perverted, wanton, wicked.

**Antonyms:** good, humble, kind, moral.

**87. deference** (*noun*)

Roger is my mentor, so I treat all his suggestions with due **DEFERENCE**.

**Synonyms:** capitulation, complaisance, docility, obeisance, submission, yielding.

**Antonyms:** impoliteness, noncompliance.

**88. deleterious** (*adjective*)

The harmful emissions from the nuclear plant will have **DELETERIOUS** effect on the health of workers.

**Synonyms:** hurtful, injurious, mischievous, noxious, pernicious, prejudicial, prejudicious, ruining.

**Antonyms:** aiding, assisting, helpful.

**89. demeanor** (*noun*)

Unlike her parents, Sandy has a haughty **DEMEANOR**.

**Synonyms:** bearing, carriage, conduct, deportment, disposition, poise, port, presence, set.

**90. demure** (*adjective*)

Amidst the noisy scenes her **DEMURE** stands out.

**Synonyms:** prudish, reticent, retiring, sedate, serious, shy, silent, sober, solemn, staid, timid, unassertive, unassuming, unassured.

**Antonyms:** extroverted, outgoing, shameless, strong.

**91. denunciation** (*verb*)

Public **DENUNCIATIONS** of the minister led to his ouster.

**Synonyms:** incrimination, indictment, invective, obloquy, rap, reprehension, reprimand, reprobation, smearing, stigmatization, vilification.

**Antonyms:** approval, commendation, compliment, praise.

**92. deplorable** (*adjective*)

The way the management has treated the worker is **DEPLORABLE**.

**Synonyms:** dreadful, execrable, faulty, grievous, grim, heartbreaking, heartrending, horrifying, intolerable, lamentable, lousy, melancholy, miserable, mournful, opprobrious, overwhelming, pitiable.

**Antonyms:** delightful, excellent, good, happy, shameless.



- 93. deprecate** (*adjective*)  
*Any kind of violence needs to be DEPRECATED.*  
**Synonyms:** discommend, discountenance, disesteem, disfavor, disparage, expostulate, frown, mudsling.  
**Antonyms:** build up, commend, compliment, endorse, laud, praise.
- 94. derelict** (*adjective*)  
*Long ago Foster led an affluent life but now he is a DERELICT.*  
**Synonyms:** disregardful, lax, regardless, remiss, slack, undependable, unreliable, untrustworthy.  
**Antonyms:** careful, caring.
- 95. derisory** (*adjective*)  
*The recent law against corruption seems to be DERISORY.*  
**Synonyms:** snippy, snobbish, snooty, supercilious, temperamental, bold, cavalier, cheeky, cold-shoulder, condescending, contumelious, cool.  
**Antonyms:** polite, respected, shy.
- 96. desolate** (*adjective*)  
*After he lost his wife, he is leading a DESOLATE life.*  
**Synonyms:** lonesome, ruined, solitary, unfrequented, uninhabited, unoccupied, vacant, waste, wild.  
**Antonyms:** cultivated, populated, used.
- 97. devastate** (*verb*)  
*We felt DEVASTATED when we received the news that my friend and his entire family was killed in the road accident.*  
**Synonyms:** level, pillage, plunder, raid, ravage, raze, ruin, sack, smash, spoil.  
**Antonyms:** construct, enrich, help, improve.
- 98. diffuse** (*adjective*)  
*The DIFFUSE lights surely enhanced the ambience of the place.*  
**Synonyms:** expanded, extended, general, prevalent, propagated, radiated, scattered, separated, strewn, thin.  
**Antonyms:** concentrated, confined, limited, restricted.
- 99. digress** (*verb*)  
*The guest speaker had DIGRESSED from his theme so much that it became difficult to keep track of what he was saying.*  
**Synonyms:** depart, divagate, drift, excursion.  
**Antonyms:** be direct, stay.
- 100. disarray** (*noun*)  
*With all the ministers warring against the president, the government procedures are in DISARRAY.*  
**Synonyms:** clutter, disarrangement, discomposure, disharmony, dishevelment, disorganization, jumble.  
**Antonyms:** harmony, order, orderliness, organization.
- 101. discern** (*verb*)  
*If you mumble, it becomes difficult for me to DISCERN what you are saying.*  
**Synonyms:** behold, descry, detect, determine, difference, differentiate, discover, discriminate, distinguish.  
**Antonyms:** disregard, neglect, overlook.



**102. dubious** (*adjective*)

Katy's **DUBIOUS** replies made her parents suspect her intentions.

**Synonyms:** *hesitant, iffy, improbable, indecisive, moot, open, perplexed, problematic, questionable, reluctant, shady.*

**Antonyms:** *positive, reliable, sure, trustworthy, trusty.*

**103. dudgeon** (*noun*)

The high **DUDGEON** on the job was tiring and irritating.

**Synonyms:** *bitterness, displeasure, fury, huff, irritation, malice, rage, resentment, umbrage, wrath.*

**Antonyms:** *teetotaler.*

**104. duplicity** (*noun*)

The products resembled the original so much that it was difficult to make out their **DUPPLICITY**.

**Synonyms:** *dirty work, dishonesty, dissemblance, dissimulation, double-dealing, dualism, duality, faithlessness.*

**Antonyms:** *forthrightness, honesty, trustworthiness.*

**105. dwindle** (*verb*)

The problems **DWINDLED** after the solution was found.

**Synonyms:** *diminish, drain, drop, ebb, fade, fall, grow less, lessen, peter out, pine, shrink, shrivel, sink, slack off, subside, taper, wane, weaken, wither.*

**Antonyms:** *enlarge, expand, extend, grow, increase, save, swell.*

**106. dynamic** (*adjective*)

The **DYNAMIC** leader received support from all quarters of life.

**Synonyms:** *potent, powerful, charismatic, compelling, driving, electric, energetic, energizing, enterprising.*

**Antonyms:** *boring, dull, inactive, passive, unexciting.*

**107. eccentric** (*adjective*)

Sandy's **ECCENTRIC** behavior attracted everyone's attention.

**Synonyms:** *bizarre, capricious, characteristic, outlandish.*

**Antonyms:** *normal, ordinary, plain, regular, standard, unexciting, usual.*

**108. ecstasy** (*noun*)

I cannot explain my **ECSTASY** in meeting all my friends after a gap of 20 years.

**Synonyms:** *delight, delirium, ebullience, elation, enchantment, enthusiasm, euphoria, exaltation, felicity, fervor, frenzy, gladness, happiness.*

**Antonyms:** *sorrow, torment, trouble, unhappiness.*

**109. edifice** (*noun*)

I stood in front of the **EDIFICE** admiring it every bit.

**Synonyms:** *habitation, house, monument, pile, skyscraper, towers.*

**110. egregious** (*adjective*)

It was an **EGREGIOUS** mistake on the part of the chairman, so the committee members decided to replace him.

**Synonyms:** *insufferable, intolerable, monstrous, nefarious, notorious, outright, preposterous, rank, scandalous, shocking, stark, capital, deplorable, extreme.*

**Antonyms:** *little, minor, secondary, slight.*

**111. elated** (*adjective*)

The management was *ELATED* to observe the positive results of the new experiment.

**Synonyms:** blissful, cheered, delighted, ecstatic, elevated, enchanted, enraptured, euphoric, exalted, excited.

**Antonyms:** depressed, down, sad, sorrowful, unhappy.

**112. elegy** (*noun*)

The *ELEGY* written by the poet is a fitting tribute to the great leader.

**Synonyms:** commemoration, eulogy, legend, memorial, monument, remembrance, sentiment.

**Antonyms:** celebration, enjoyment, praise.

**113. eloquent** (*verb*)

The leader earned popularity on account of his *ELOQUENT* speeches.

**Synonyms:** fervent, fervid, fluent, forceful, glib, grandiloquent, graphic, impassioned, impressive, indicative, magniloquent.

**Antonyms:** dull, inarticulate.

**114. elucidate** (*verb*)

Peter *ELUCIDATED* all the precautions one has to take before embarking on the journey.

**Synonyms:** clarify, clear, clear up, decode, demonstrate, draw a picture, enlighten, exemplify, explicate, expound, get across, gloss, illuminate, illustrate.

**Antonyms:** distract, make ambiguous, mix up, mystify, obscure.

**115. embark** (*verb*)

We were surprised that at a young age Eva decided to *EMBARK* on such a risky journey.

**Synonyms:** enter, entrain, launch, leave port, plunge into, set about, set out, set sail, take onboard, take ship.

**Antonyms:** disembark, stay.

**116. embezzle** (*verb*)

The corrupt minister had *EMBEZZLED* enough money before he was sacked.

**Synonyms:** defalcate, filch, forge, loot, misapply, misappropriate, misuse, peculate, pilfer, purloin.

**Antonyms:** compensate, give, pay, reimburse, return.

**117. emigrate** (*verb*)

After the bloody revolution many *EMIGRATED* to safer places.

**Synonyms:** migrate, move abroad, quit, remove, transmigrate.

**Antonyms:** remain, stay.

**118. empathy** (*noun*)

Do not expect any *EMPATHY* from me, if you are found breaking the rules of the company.

**Synonyms:** appreciation, communion, community of interests, compassion, comprehension, pity, rapport.

**Antonyms:** apathy, misunderstanding, unfeelingness.

**119. emulate** (*verb*)

He tries his best to *EMULATE* his father's business tactics.

**Synonyms:** compete, compete with, contend, imitate, make like, mimic, mirror.

**Antonyms:** abandon, desert, give up.

**120. endanger** (*verb*)

*Water pollution has certainly ENDANGERED the marine life.*

**Synonyms:** *expose, hazard, imperil, lay on the line, lay open, leave defenseless, leave in the middle, make liable, menace, peril, play into one's hands, put at risk.*

**Antonyms:** *assist, comfort, help, save.*

**121. endorse** (*verb*)

*All his evil deeds were ENDORSED by his ignorant parents.*

**Synonyms:** *advocate, affirm, approve, attest, authenticate, back, stand stump for, subscribe to, sustain, underwrite, uphold, vouch for, warrant, witness.*

**Antonyms:** *disapprove, oppose, protest, reject, repel.*

**122. enervate** (*verb*)

*After the rigorous exercise, I was ENERVATED and felt faint.*

**Synonyms:** *disable, enfeeble, exhaust, fatigue, incapacitate, jade, paralyze, sap, unnerve, vitiate, weaken, weary.*

**Antonyms:** *animate, empower, energize, invigorate, liven, strengthen.*

**123. enigma** (*noun*)

*How a poor woman like Glory turned out to be the richest woman of the town is still an ENIGMA to most of us.*

**Synonyms:** *bewilderment, crux, cryptogram, grabber, problem, puzzle, question, question mark, riddle, secret.*

**Antonyms:** *known, understanding.*

**124. enjoin** (*verb*)

*The new headmaster ENJOINED obedience on all the students.*

**Synonyms:** *decree, demand, dictate, direct, forewarn, impose, instruct, ordain, prescribe, require, rule, tell, urge, warn.*

**Antonyms:** *increase.*

**125. envisage** (*verb*)

*When we launched the project, we did not ENVISAGE so many difficulties.*

**Synonyms:** *behold, conceive, conceptualize, contemplate, externalize, fancy, feature.*

**Antonyms:** *ignore.*

**126. ephemeral** (*adjective*)

*Your poverty is only EPHEMERAL; good times are ahead of you.*

**Synonyms:** *fugitive, impermanent, short, short-lived, temporary, transient, transitory, unenduring, volatile.*

**Antonyms:** *eternal, everlasting, interminable, lasting, long, permanent, perpetual.*

**127. equivocal** (*adjective*)

*The politician's statements were so EQUIVOCAL that even a naïve person could understand his intentions.*

**Synonyms:** *ambivalent, clouded, disreputable, problematic, puzzling, questionable, suspect, suspicious, unclear, undecided.*

**Antonyms:** *definite, determined, obvious, plain, sure, unequivocal, unquestionable.*

**128. eventuate** (*verb*)

The recession soon *EVENTUATED* in unemployment in various sectors.

**Synonyms:** follow, happen, issue, occur, result, stop, take place, terminate.

**Antonyms:** cause.

**129. exacerbate** (*verb*)

Philip's ill health *EXACERBATED* his problems.

**Synonyms:** madden, provoke, rattle one's cage, rub salt in vex, worsen, aggravate, annoy, egg on.

**Antonyms:** calm, comfort, help, soothe.

**130. exhort** (*verb*)

My boss *EXHORTED* all of us to put in more effort and complete the work on time.

**Synonyms:** encourage, enjoin, entreat, goad, incite, insist, persuade, plead, preach, press, pressure, prick, prod, prompt, propel, spur, stimulate.

**Antonyms:** betray, deceive, delude, fool, lie, pretend, trick.

**131. extravagant** (*adjective*)

Bob makes *EXTRAVAGANT* purchases and later regrets.

**Synonyms:** fantastic, flamboyant, flashy, foolish, garish, gaudy, grandiose, immoderate, implausible, improvident, imprudent, inordinate, lavish, ludicrous, nonsensical, ornate.

**Antonyms:** provident, reasonable, saving, stingy, thrifty, unpretentious.

**132. exuberant** (*adjective*)

The *EXUBERANT* celebrations organized by the governor won every one's heart.

**Synonyms:** bouncy, brash, buoyant, cheerful, chipper, eager, ebullient, effervescent, elated, excited, exhilarated.

**Antonyms:** discouraged, lifeless, unenthusiastic, unexcited.

**133. exultant** (*adjective*)

After the leader won the election with great majority, his *EXULTED* supporters danced in joy.

**Synonyms:** high, joyful, joyous, jubilant, overjoyed, rejoicing, reveling, transported, triumphant, turned on, wowed.

**Antonyms:** discouraged, sad, sorrowful, unhappy.

**134. extrovert** (*adjective*)

Unlike his wife, Sam is an *EXTROVERT* and loves partying.

**Synonyms:** exhibitionist, gregarious person, show-off.

**Antonyms:** introvert.

**135. extrude** (*verb*)

We tried to *EXTRUDE* the ring from the narrow bottle.

**Synonyms:** boot, chase, dismiss, eject, evict, expel.

**Antonyms:** take in.

**136. facet** (*noun*)

There are many *FACETS* to the problem of poverty and each has to be handled carefully.

**Synonyms:** character, face, hand, level, obverse, part, phase, slant, switch, twist.

**Antonyms:** whole.

**137. fad** (*verb*)

*Glory's FADS about clothes irritate me to the core.*

**Synonyms:** *innovation, mania, mode, passing fancy, passion, quirk, rage trend, vagary, vogue, whim.*

**Antonyms:** *standard, tradition.*

**138. fanatical** (*adjective*)

*I fail to understand his FANATICAL attitude about certain political issues.*

**Synonyms:** *biased, contumacious, credulous, devoted, dogmatic, enthusiastic, erratic, extreme, fervent, feverish, fiery, frenzied, headstrong, impassioned, impulsive, incorrigible, infatuated, narrow-minded, nuts for, obsessed, obsessive.*

**Antonyms:** *disinterested, dispassionate, impartial, unenthusiastic.*

**139. fatal** (*adjective*)

*Driving rashly will prove FATAL to your life.*

**Synonyms:** *malefic, malignant, mortal, noxious, pernicious, pestilent, poisonous, ruinous, terminal, virulent.*

**Antonyms:** *healthful, life-giving, nourishing, vital.*

**140. fatigue** (*noun*)

*It took me many days to get over my FATIGUE and return to normal.*

**Synonyms:** *exhaustion, faintness, feebleness, heaviness, languor, lassitude, lethargy, listlessness, overtiredness, weakness, weariness.*

**Antonyms:** *freshness, liveliness, spirit, vigor.*

**141. feasible** (*adjective*)

*Your idea is not FEASIBLE because it is beyond my budget.*

**Synonyms:** *achievable, advantageous, appropriate, attainable, beneficial, breeze, cinch, duck soup.*

**Antonyms:** *unfeasible, unlikely, unpractical, unreasonable, inconceivable.*

**142. fervor** (*noun*)

*Tommy's revolutionary FERVOR overwhelmed all his friends and they are ready to follow his footsteps.*

**Synonyms:** *passion, pep talk, piety, piousness, religiousness, seriousness, sincerity, solemnity, vehemence, warmth, weakness, wholeheartedness, zeal, zealousness.*

**Antonyms:** *apathy, coolness, discouragement.*

**143. fictional** (*adjective*)

*Nobody gave any credence to his FICTIONAL story.*

**Synonyms:** *fanciful, fictive, imaginary, imagined, invented, made-up, make-believe, pretend.*

**Antonyms:** *grave, ordinary, real, serious, sincere, unfanciful, unimaginative, unromantic.*

**144. fishy** (*adjective*)

*I could easily make out that there was something FISHY about his behavior.*

**Synonyms:** *doubtable, dubious, dubitable, equivocal, far-fetched, funny, implausible, improbable, odd, problematic, queer.*

**Antonyms:** *likely, probable, real, truthful, unquestionable, unsuspecting.*

**145. flaunt** (verb)

*Although Harry is very rich, he hates to FLAUNT his wealth.*

**Synonyms:** brandish, break out, broadcast, declare, disclose, display, disport, divulge, expose, flash, flash about.

**Antonyms:** conceal, hide, refrain.

**146. flinch** (verb)

*Even while facing a knife on her face, Sandy did not FLINCH a bit.*

**Synonyms:** duck, elude, escape, eschew, evade, flee, quail, recede, recoil, retire, retreat, shirk, shrink, shun, start, swerve.

**Antonyms:** confront, face, meet.

**147. forbid** (verb)

*In the wake of a terrorist threat, the government decided to FORBID movement in the border area.*

**Synonyms:** cancel, censor, check, debar, declare illegal, deny, deprive, disallow, embargo, enjoin, exclude, forestall.

**Antonyms:** approve, authorize, permit, sanction.

**148. formidable** (adjective)

*Lazarus was a FORMIDABLE opponent, so I thought of a new strategy to defeat her.*

**Synonyms:** awful, dangerous, daunting, dire, dismaying, dreadful, fearful, fierce, frightful, horrific, imposing.

**Antonyms:** friendly, harmless, nice, pleasant, powerless, weak.

**149. fragile** (adjective)

*Angelina's FRAGILE nature keeps her in her own cocoon.*

**Synonyms:** frail, frangible, insubstantial, shivery, slight, unsound, weak, weakly.

**Antonyms:** firm, strong, tough, unbreakable.

**150. frantic** (adjective)

*All the FRANTIC attempts made by the police to locate the kidnapped minister did not yield any results.*

**Synonyms:** fraught, freaked out, frenetic, frenzied, furious, hectic, hot and bothered, hot under the collar, hyper, in a stew.

**Antonyms:** collected, composed, docile, peaceful.

**151. frustrated** (adjective)

*Glory felt FRUSTRATED when her sincerity was not recognized by her manager.*

**Synonyms:** crimp, dash, defeat, depress, discourage, dishearten, foil, forbid, forestall, halt, hang up, hinder.

**Antonyms:** cooperate, encourage, facilitate, help, support.

**152. furor** (noun)

*Lendy's FUROR caused the management to pay her dues without any further delay.*

**Synonyms:** agitation, big scene, big stink, bustle, commotion, craze, enthusiasm, fad, ferment.

**Antonyms:** calm, peace.

**153. furtive** (*adjective*)

Her FURTIVE attempts to hide herself from her manager did not succeed.

**Synonyms:** cautious, circumspect, clandestine, cloaked, conspiratorial, cunning, disguised, elusive, insidious, masked.

**Antonyms:** forthright, honest, open, truthful.

**154. futile** (*adjective*)

Sam made FUTILE attempts to win over the public on to his side.

**Synonyms:** barren, bootless, delusive, empty, exhausted, forlorn, fruitless, hollow, idle, impracticable, impractical, in vain, ineffective.

**Antonyms:** fruitful, hopeful, productive, profitable.

**155. fussy** (*adjective*)

Initially I thought Vendy was being FUSSY but later realized she was only being overcautious.

**Synonyms:** choosy, conscientious, difficult, discriminating, exact, exacting, fastidious, finical, finicky, fretful, fuddy-duddy.

**Antonyms:** uncritical, undemanding.

**156. gait** (*noun*)

Cauline's GAIT is so funny that we cannot stop laughing whenever we see her.

**Synonyms:** canter, carriage, clip, gallop, get along, movement, pace, run, speed, step, stride, tread, trot, walk.

**157. gamut** (*noun*)

Katty showed a GAMUT of emotions in her performance.

**Synonyms:** catalogue, compass, diapason, extent, field, panorama, scale, scope, series, spectrum, sweep.

**Antonyms:** extreme.

**158. gasp** (*verb*)

I gave a GASP of surprise when I found a new car parked in front of my house.

**Synonyms:** ejaculation, exclamation, gulp, heave, pant, puff, wheeze, whoop.

**Antonyms:** assist, promote, advance, further, forward, help, aid.

**159. genuine** (*adjective*)

Her GENUINE smile and confident talk convinced the customers to invest in the new scheme.

**Synonyms:** sterling, sure-enough, tested, true, unadulterated, unimpeachable, unquestionable, unvarnished, valid, veritable, very, whole.

**Antonyms:** counterfeit, false, illegitimate, sham, unreal.

**160. gesture** (*verb*)

Grant's angry GESTURES scared the crowd away.

**Synonyms:** gesticulation, indication, intimation, kinesics, pantomime, reminder, salute, shrug, sign, signal, token, wave, wink.

**Antonyms:** speech.



**161. giddy** (*adjective*)

*I felt GIDDY with the news that I was going to be sworn in as the new president.*

**Synonyms:** bubble headed, capricious, careless, changeable, changeful, ditzzy, dizzy, empty-headed, erratic, fickle, flighty, flustered, frivolous, gaga, heedless, inconstant.

**Antonyms:** calm, level-headed, sensible, serious.

**162. gimmick** (*noun*)

*The advertising agency is known for its sales GIMMICKS.*

**Synonyms:** gizmo, imposture, instrument, jest, maneuver, means, method, ploy, ruse, secret, shift, sport, stratagem, stunt, trick, widget, wile.

**Antonyms:** candor, honesty, innocence.

**163. glamorous** (*adjective*)

*Nancy was looking GLAMOROUS in her new white gown.*

**Synonyms:** captivating, charismatic, charming, classy, dazzling, elegant, enchanting.

**Antonyms:** lackluster, ugly, unglamorous, unsophisticated.

**164. gloomy** (*adjective*)

*Her cheerful presence helped in getting over the GLOOMY atmosphere.*

**Synonyms:** lightless, murky, obscure, overcast, overclouded, sepulchral, shadowy, somber, tenebrous, unlit, wintry.

**Antonyms:** bright, light, sunny.

**165. gossip** (*noun*)

*The students were warned strictly not to GOSSIP over the murder in the campus.*

**Synonyms:** conversation, cry, defamation, dirty laundry, dirty linen, earful, grapevine, hearsay, idle talk, injury, malicious talk, meddling, news, prate.

**Antonyms:** fact, wisdom, sense.

**166. grandeur** (*noun*)

*All the guests were impressed with the GRANDEUR of arrangements.*

**Synonyms:** greatness, immensity, impressiveness, inclusiveness, loftiness, luxuriousness, magnificence, majesty, might, nobility, opulence, pomp, preeminence, richness, splendor, state, stateliness, sublimity, sumptuousness, sway.

**Antonyms:** insignificance, unimportance.

**167. grieve** (*verb*)

*My sister passed away in a tragic accident and we still GRIEVE her death.*

**Synonyms:** deplore, endure, keen, lament, regret, rue, sorrow, suffer, wail, weep.

**Antonyms:** be glad, be happy.

**168. grit** (*noun*)

*Susan's boss appreciated her GRIT for completing the formidable task on time.*

**Synonyms:** courage, determination, firmness, fortitude, guts, hardihood, heart, intestinal fortitude, mettle, moral fiber, nerve, resolution, resolve, spunk, stamina, steadfastness, tenacity, toughness, will, willpower.

**Antonyms:** ineptness, powerlessness, spinelessness, weakness.



**169. grope** (verb)

The police had no clues about the criminal, so were still *GROPING* in darkness.

**Synonyms:** flounder, fumble, grabble, handle, manipulate, poke, pry, root, scrabble, search, touch.

**Antonyms:** do well, succeed.

**170. gruesome** (adjective)

All the leading newspapers reported the *GRUESOME* incident in their headlines.

**Synonyms:** appalling, daunting, fearful, frightful, ghastly, grim, grisly, hideous, horrendous, horrid, horrific.

**Antonyms:** beautiful, pleasant, pretty.

**171. hackneyed** (adjective)

The *HACKNEYED* advertisement has created a negative impact on the minds of the viewers.

**Synonyms:** antiquated, banal, common, commonplace, stock, threadbare, timeworn, trite, well-worn, worn-out.

**Antonyms:** fresh, new, original, uncommon.

**172. haggard** (adjective)

After the tiring trek, I felt *HAGGARD* and had no energy for cooking dinner.

**Synonyms:** ashen, careworn, drawn, emaciated, exhausted, faded, fagged, fatigued, fretted.

**Antonyms:** fresh, healthy, hearty, strong, unworn.

**173. haggle** (verb)

I hate people who *HAGGLE* over the price of a good even after reading the display 'No Bargain'.

**Synonyms:** bargain, barter, beat down, cavil, chaffer, deal, dicker, dispute.

**Antonyms:** agree, comply, concur.

**174. hallucinate** (verb)

My neighbor *HALLUCINATES* that she is being chased by a stranger.

**Synonyms:** daydream, envision, fantasize, freak out, have visions.

**Antonyms:** experience.

**175. hapless** (adjective)

I felt *HAPLESS* after losing all my money in the casino.

**Synonyms:** infelicitous, jinxed, loser, luckless, miserable, poor fish.

**Antonyms:** fortuitous, fortunate, lucky.

**176. harangue** (verb)

The politician *HARANGUED* about all the benefits we would reap, if we elected him.

**Synonyms:** exhortation, hassle, jeremiad, oration, sermon, speech, spouting, tirade.

**Antonyms:** be quiet.

**177. hassle** (verb)

I don't understand why you find it a *HASSLE* to complete the work on time, but Peter does not.

**Synonyms:** quarrel, row, squabble, struggle, trial, trouble, try, tumult, turmoil, tussle, uproar, upset, whirl, wrangle.

**Antonyms:** agreement, peace.

**178. hauteur** (*noun*)

Sally's HAUTEUR has become a matter for gossip in the office circles.

**Synonyms:** haughtiness, nerve, pomposity, pompousness, presumption, pride, self-importance, snobbishness, vanity.

**Antonyms:** humility, meekness, servility.

**179. hazardous** (*adjective*)

Gerry is 70 and it is HAZARDOUS for him to take this adventurous trip.

**Synonyms:** perilous, precarious, risky, touchy, uncertain, unhealthy, unsafe, unsound, wicked.

**Antonyms:** guarded, predictable, protected, safe, secure.

**180. hilarious** (*adjective*)

As I entered the conference hall, I noticed that the atmosphere there was HILARIOUS.

**Synonyms:** jocular, jolly, jovial, joyful, joyous, laughable, lively, merry, mirthful, noisy, priceless, riot, rollicking, scream, uproarious, witty.

**Antonyms:** serious, somber, tragic.

**181. hoard** (*verb*)

William has HOARDED so much of wealth that his next few generations can lead a life of affluence.

**Synonyms:** fund, garner, heap, inventory, mass, nest egg, pile, reserve, reservoir, riches, stock, store, supply, treasure, treasure-trove, trove, wealth.

**Antonyms:** debt.

**182. horrendous** (*adjective*)

The target set is so tight that all will be left with a HORRENDOUS experience.

**Synonyms:** disturbing, dread, dreaded, dreadful, extreme, fearful, frightful, ghastly, gruesome, harrowing, hateful, hideous, horrible, horrid.

**Antonyms:** pleasant, pleasing, welcomed, wonderful.

**183. huddle** (*verb*)

The children were HUDDLED in the small room, so they felt suffocated.

**Synonyms:** clutter, confusion, disarray, discussion, disorder, gathering, group, heap, jumble.

**Antonyms:** disperse, scatter.

**184. hypocrisy** (*noun*)

I was not surprised to listen to Randy as everyone who knew him had warned me about his HYPOCRISY.

**Synonyms:** bigotry, cant, casuistry, deceit, deception, dishonesty, display, dissembling, dissimulation, double-dealing.

**Antonyms:** honesty, righteousness, sincerity, truth.

**185. hysterical** (*adjective*)

I failed to understand her HYSTERICAL reaction over such a small issue.

**Synonyms:** bad faith, bigotry, cant, casuistry, deceit, deception, dishonesty, display, dissembling, dissimulation, double-dealing.

**Antonyms:** honesty, righteousness, sincerity, truth.

**186. Imaginary** (*adjective*)

*Unlike her brother, Sandra always lives in an IMAGINARY world.*

**Synonyms:** nonexistent, notional, shadowy, spectral, supposed, supposititious, theoretical, unreal, unsubstantial, visionary, whimsical.

**Antonyms:** genuine, physical, real, substantial, true.

**187. Imbroglio** (*noun*)

*The writer of the play seemed to be in a state of IMBROGLIO, so the viewers failed to understand what he wanted to say.*

**Synonyms:** bickering, brawl, broil, complexity, complication, dispute, embarrassment, embroilment, entanglement.

**Antonyms:** agreement, peacemaking.

**188. Imbue** (*verb*)

*It is parents who have to IMBUE the right kind of values in their children.*

**Synonyms:** inculcate, infix, ingrain, inoculate, instill, invest, leaven, permeate, pervade, steep, suffuse.

**Antonyms:** drain, take out.

**189. Immaculate** (*adjective*)

*Rogers was IMMACULATELY dressed for the occasion.*

**Synonyms:** neat, pure, snowy, spick-and-span, spotless, spruce, stainless, taintless, trim, unexceptionable, unsoiled, unsullied.

**Antonyms:** foul, tainted, unclean, unsterile.

**190. Imminent** (*adjective*)

*Sam's family was relieved when the doctor informed them that there was no IMMINENT danger to life.*

**Synonyms:** immediate, impending, in store, in the offing, in the wind, in view, inescapable, ineluctable.

**Antonyms:** doubtful, far, future, later.

**191. Impair** (*adjective*)

*The unexpected death of his wife IMPAIRED Foster's life.*

**Synonyms:** make useless, mar, prejudice, queer, reduce, rough up, spoil, tarnish, total, tweak, undermine, unfit, vitiate, weaken, worsen.

**Antonyms:** aid, assist, help.

**192. Imperative** (*verb*)

*It is IMPERATIVE that all those who are involved in the new project must work in absolute co-ordination.*

**Synonyms:** important, importunate, indispensable, inescapable, insistent, instant, no turning back, obligatory, pressing, urgent, vital.

**Antonyms:** optional, secondary, unnecessary, voluntary.

**193. Imperil** (*verb*)

*It is the manager's negligence that IMPERILED the whole project.*

**Synonyms:** endanger, expose, hazard, jeopardize, menace, peril, risk.

**Antonyms:** guard, protect, save.

**194. Impertinent** (*adjective*)

*I cannot stand IMPERTINENT behavior from my kids.*

**Synonyms:** forward, fresh, ill-mannered, impolite, impudent, inappropriate, incongruous, inquisitive.

**Antonyms:** mannered, nice, polite, refined, respectful.

**195. Impetuous** (*adjective*)

Randy's *IMPETUOUS* decision to resign from his job put his family into trouble.

**Synonyms:** sudden, swift, unbridled, unexpected, unplanned, unpremeditated, unreflecting, unrestrained, unthinking, vehement, violent.

**Antonyms:** circumspect, considerate, reflective, sensible, thoughtful, wise.

**196. Implacable** (*adjective*)

The victims of the natural disaster were *IMPLACABLE*; they felt government should have taken precautionary measures.

**Synonyms:** inflexible, intractable, ironfisted, mortal, pitiless, rancorous, relentless, remorseless, ruthless.

**Antonyms:** kind, merciful, nice, placable.

**197. Impoverish** (*verb*)

The priest was of the opinion that the youth of the present generation is spiritually *IMPOVERISHED*.

**Synonyms:** disconfirm, dispirit, disprove, downgrade, enervate, enfeeble, humiliate, impair, impoverish, incapacitate, pauperize, rebut, reduce, refute, ruin, subdue, tame, undermine.

**Antonyms:** stabilize, strengthen.

**198. Impudent** (*adjective*)

Edwards's *IMPUDENT* behavior shocked his entire team.

**Synonyms:** impertinent, insolent, nervy, off-base, overbold, presumptuous, rude, unabashed, unblushing.

**Antonyms:** humble, modest, polite, retiring.

**199. Inarticulate** (*adjective*)

Peter's *INARTICULATE* speech failed to impress the students.

**Synonyms:** maundering, muffled, mumbled, mumbling, mute, obscure, reticent, silent speechless, stammering, tongue-tied, unclear, unintelligible, unspoken, unuttered, unvoiced, unvoiced, vague, voiceless, wordless.

**Antonyms:** articulate, communicative.

**200. Incendiary** (*adjective*)

The politician's *INCENDIARY* remarks about his neighboring country resulted in a war.

**Synonyms:** dissentious, inflammatory, malevolent, provocative, rabble-rousing, seditious, subversive, treacherous, wicked.

**Antonyms:** peacemaking.

**201. Inchoate** (*adjective*)

The plan to start a rehabilitation centre is still in an *INCHOATE* state.

**Synonyms:** incipient, just begun, nascent, preliminary, rudimentary, shapeless, unfinished, unformed, unshaped.

**Antonyms:** developed, grown, mature.

**202. Incognito** (*adjective*)

After the incident, the police officer decided to pursue the rest of the case *INCOGNITO*.

**Synonyms:** isolated, masked, masquerading, obscure, under assumed name, unknown, unrecognized.

**Antonyms:** known, openly, seen, unhidden.

**203. Incompatible** (adjective)

The couple is *INCOMPATIBLE* from the beginning, so it is not surprising that they have applied for a divorce.

**Synonyms:** inconstant, irreconcilable, jarring, mismatched, offbeat, opposed, opposite, poles apart, unadapted, uncongenial, unsuitable, unsuited, warring.

**Antonyms:** consonant, harmonious, loving, suited, well-matched.

**204. Incongruous** (adjective)

Her dressing style was *INCONGRUOUS* with the occasion; she received a lot of criticism.

**Synonyms:** irregular, jumbled, lopsided, mismatched, out of keeping, rambling, shifting, twisted, unavailing, unbalanced, unbecoming, unconnected.

**Antonyms:** fitting, harmonious, matched, suitable, uniform.

**205. Incredible** (adjective)

Whatever Grant said was *INCREDIBLE*, so most of the members did not believe him.

**Synonyms:** phony, preposterous, questionable, ridiculous, rings phony, unbelievable, unconvincing.

**Antonyms:** credible, plausible, possible, realistic, tenable.

**206. Indict** (verb)

The jury did not *INDICT* Foster because there was no convincing evidence against him.

**Synonyms:** impeach, incriminate, inculcate, prosecute, summon, tax.

**Antonyms:** absolve, acquit, exonerate.

**207. Ingenuity** (noun)

Sam was praised for his *INGENUITY* in work.

**Synonyms:** creativity, cunning, dexterity, flair, genius, gumption, intelligence, inventiveness, resourcefulness, shrewdness.

**Antonyms:** inability, ineptness, obtuseness, stupidity.

**208. Innocuous** (adjective)

Sometimes on account of your intonation, even your *INNOCUOUS* statements are misunderstood.

**Synonyms:** inoffensive, insipid, jejune, kind, painless, safe, sapless, unoffending, weak.

**Antonyms:** damaging, destructive, harmful, hurtful, injurious.

**209. Intemperate** (adjective)

Public felt that the new laws were passed in *INTEMPERATE* haste; the new laws were not well received.

**Synonyms:** disturbing, galling, grievous, hard, harsh, heartbreaking, hurtful, inclement, intemperate, intense, merciless, offensive.

**Antonyms:** good, helping, wonderful.

**210. Intrepid** (adjective)

Dr. Christian Barnard was impressed with the performance of the *INTREPID* boys.

**Synonyms:** heroic, lionhearted, nerveless, plucky, resolute, stalwart, unafraid, undaunted, unflinching valiant, valorous.

**Antonyms:** cowardly, meek, timid.

**211. Invigorate** (verb)

Nancy's motivational speech **INVIGORATED** all the workers and they promised to extend their full support.

**Synonyms:** exhilarate, fortify, freshen, galvanize, harden, inspirit, liven up, nerve, pep up, perk up, pick up, quicken, rally, refresh, reinforce, rejuvenate, renew, restore.

**Antonyms:** depress, dishearten, dull, enervate.

**212. Irrefutable** (adjective)

The reasons offered by Dorothy for introducing new changes were **IRREFUTABLE**, so the employees decided to obey her.

**Synonyms:** ironclad, irrefutable, irrefragable, irresistible, obvious, odds-on, positive, proven, set, sure, unanswerable, unassailable, undeniable, unimpeachable, unquestionable.

**Antonyms:** dubious, questionable, refutable, uncertain.

**213. Irresolute** (adjective)

Glory's **IRRESOLUTE** answers irritated the police; their suspicions about her involvement grew stronger.

**Synonyms:** shaky, tentative, timid, uncertain, undecided, undetermined, unsettled, unstable, unsteady, vacillating, waffling, wavering.

**Antonyms:** determined, obstinate, resolute, stubborn, unyielding, willful.

**214. Irremediable** (adjective)

What she did to her husband was **IRREMEDIABLE**; no one can forgive her.

**Synonyms:** impossible, impracticable, indispair, incurable, irredeemable, irreparable, irreversible.

**Antonyms:** mendable, repairable.

**215. Irritate** (verb)

The parents failed to understand why the child was **IRRITATED**.

**Synonyms:** harass, incense, inflame, infuriate, irk, madden, needle, nettle, offend, pain, peeve, pester, pique, provoke, put out, rankle, rile, roil, ruffle, sour, try, vex.

**Antonyms:** assuage, delight, help, please.

**216. Jeopardize** (verb)

Alice had no clue that the crooked manager **JEOPARDIZED** all her efforts.

**Synonyms:** peril, put at risk, put in danger, put in jeopardy, risk, stake, subject to, tempt, fate, threaten.

**Antonyms:** guard, protect, save.

**217. Jinx** (verb)

Grace failed to understand the **JINX** of losing a bet whenever she wore a red dress.

**Synonyms:** enchantment, nemesis, plague, spell, voodoo.

**Antonyms:** advantage, benefit, boon, luck.

**218. Jitters** (noun)

When I saw my zero bank balance, I had **JITTERS**.

**Synonyms:** jumps, nerves, shakes, shivers, tenseness, willies.

**Antonyms:** calmness.

**219. Jocose** (adjective)

Betsy's **JOCOSE** nature won her many friends.

**Synonyms:** funny, humorous, jocular, joking, merry, playful, sportive, waggish, witty.

**Antonyms:** serious, tragic, unamusing, unfunny.

**220. Jocund** (*adjective*)

The *JOCUND* mood of the youngsters soon spread to the elders and all were happy

**Synonyms:** elated, jocose, jocular, jolly, lighthearted, sprightly.

**Antonyms:** sad.

**221. Jostle** (*verb*)

The *JOSTLE* over the free food irritated me a lot.

**Synonyms:** hustle, jab, jog, joggle, jolt, nudge, press, push, push around, push aside, scramble, shoulder, shove.

**Antonyms:** desert, give up, leave, retreat.

**222. Judicious** (*adjective*)

Sandy's *JUDICIOUS* efforts brought her great laurels.

**Synonyms:** efficacious, enlightened, expedient, far-sighted, informed, judicial, keen, perceptive, perspicacious, politic, profound, prudent, quick-witted, rational.

**Antonyms:** idiotic, injudicious, irrational, nonsensical, reckless, senseless, thoughtless, unwise.

**223. Jumble** (*verb*)

The little girl *JUMBLED* her speech but it still sounded cute.

**Synonyms:** medley, mess, miscellany, mixture, muddle, patchwork, potpourri, snarl, tangle, tumble.

**Antonyms:** order; organization.

**224. Juncture** (*noun*)

At this *JUNCTURE*, I can think of nothing but saving my friend.

**Synonyms:** moment, occasion, pass, pinch, plight, point, position, posture, predicament, quandary, state, status, strait, time, zero hour.

**Antonyms:** disconnection.

**225. Junk** (*adjective*)

I discourage my family from eating *JUNK* food.

**Synonyms:** fragments, garbage, rubbish, rubble, ruins, trash.

**Antonyms:** cleanliness, neatness, purity.

**226. keen** (*adjective*)

I noticed Albert was *KEEN* about joining the camp so I granted him permission.

**Synonyms:** avid, breathless, devoted, dying to, eager, earnest, ebullient, fervent, fervid, fierce, impassioned, impatient, intense, intent.

**Antonyms:** reluctant, unenthusiastic, uninterested.

**227. kindle** (*verb*)

After reading the novel, my interest in watching the movie, which was based on the novel, was *KINDLED*.

**Synonyms:** burn, fire, flame, flare, glow, ignite, inflame, light, set alight, set fire.

**Antonyms:** extinguish, put out.

**228. knack** (*noun*)

He has the *KNACK* of impressing everyone with his talk.

**Synonyms:** bent, capacity, command, dexterity, expertise, expertism, expertness, facility, faculty, flair, forte, genius, gift, handiness, hang of it, ingenuity.

**Antonyms:** ineptitude, lack, want.



**229. knotty** (*adjective*)

The problem was so **KNOTTY** that even the expert had to spend a lot of time in resolving it.

**Synonyms:** complex, complicated, difficult, effortful, elaborate, formidable, hard, intricate, involved, labyrinthine, mazy, mystifying, nodulous, perplexing.

**Antonyms:** simple, uncomplicated, untroublesome.

**230. known** (*adjective*)

Cynthia is **KNOWN** for her patience but she lost her cool when she saw the shoddy job.

**Synonyms:** cognize, comprehend, differentiate, discern, discriminate, distinguish, experience, fathom, feel certain, get the idea, grasp.

**Antonyms:** misinterpret, misunderstand.

**231. laborious** (*adjective*)

When I accepted my new role, I never expected it to be so **LABORIOUS**.

**Synonyms:** forced, heavy, herculean, labored, onerous, operose, ponderous, rough go, stiff, strained, strenuous, tiresome, toilsome, tough.

**Antonyms:** effortless, facile, simple, trivial.

**232. labyrinth** (*noun*)

We need to take a guide along with us because it is difficult to find our way through the **LABYRINTH** of pathways.

**Synonyms:** complication, convolution, entanglement, intricacy, jungle, knot, mesh, morass.

**Antonyms:** method, order, organization, orientation, system.

**233. lacking** (*adjective*)

Alice is **LACKING** in courage to fight her step-father; he is taking advantage of this.

**Synonyms:** without, minus, miss, need, require, want.

**Antonyms:** have.

**234. lackluster** (*adjective*)

It was not surprising that the **LACKLUSTER** performance did not receive any applause.

**Synonyms:** obscure, pabulum, prosaic, sombre, colorless, dark, dead, dim, rab, draggy, dry.

**Antonyms:** enthusiastic, lively, shining, shiny, spirited.

**235. lambaste** (*verb*)

Although her books generally get raving reviews, her new book was **LAMBASTED** by her critics.

**Synonyms:** reprimand, rip into, roast, scathe, scold, scorch, scourge, slap, slash, smear, smother, strike, thrash, trim, upbraid, wallop, whip.

**Antonyms:** praise, uphold.

**236. languid** (*verb*)

Harry's wife often complains about the **LANGUID** nature of her children; they seem to have no energy for anything.

**Synonyms:** lazy, leaden, leisurely, lethargic, limp, moony, nebbish, phlegmatic, pining, sickly, sleepyhead, slow, sluggish, snoozy, spiritless, supine, torpid, unconcerned.

**Antonyms:** animated, energetic, lively, spirited, vivacious.



**237. languish** (*verb*)

*It was a pity that she had to LANGUISH in the hospital for several days before her illness was diagnosed.*

**Synonyms:** hanker, hunger, knock out, long, rot, sicken, sigh, snivel, sorrow, suffer, tucker, waste, waste away, weaken, wilt, wither, yearn.

**Antonyms:** grow, improve, strengthen.

**238. laudatory** (*adjective*)

*David's LAUDATORY remarks made his team members happy and they promised to help him.*

**Synonyms:** commendatory, eulogistic, flattering, laudative, panegyric, praiseful.

**Antonyms:** blaming, castigating, critical.

**239. lavish** (*adjective*)

*The new rule restricts government officials from LAVISH spending.*

**Synonyms:** munificent, openhanded, opulent, plentiful, plush, posh, prodigal, profligate, profusive, prolific, riotous, sumptuous, swanky, thriftless, unreasonable, unrestrained, unsparing, unstinging, wasteful, wild.

**Antonyms:** scanty, scarce, small, spare.

**240. leery** (*adjective*)

*Though he looks honest and dependable, I am a little LEERY about allowing him to handle such huge amounts.*

**Synonyms:** chary, distrustful, doubting, dubious, on one's guard, shy, skeptical, uncertain, unsure, wary.

**Antonyms:** certain, sure, unwary.

**241. listless** (*adjective*)

*From the time I heard the sad news, I felt LISTLESS.*

**Synonyms:** enervated, faint, heavy, heedless, impassive, inanimate, inattentive, indifferent, indolent, inert.

**Antonyms:** alert, attentive, energetic, lively, untired.

**242. loath** (*adjective*)

*I am LOATH to the idea of borrowing or lending money.*

**Synonyms:** disinclined, hesitant, indisposed, opposed, reluctant, remiss, resisting, uneager, unwilling

**Antonym:** for, unopposed, willing.

**243. loiter** (*verb*)

*The police questioned two women who were LOITERING on the street during odd hours.*

**Synonyms:** fritter away, halt, hover, idle, lag, linger, loaf, loll, lounge, passtime, pause, poke, procrastinate, put off.

**Antonyms:** leave, rush.

**244. loquacious** (*adjective*)

*Randy is LOQUACIOUS but his younger brother is taciturn.*

**Synonyms:** jabbering, long-winded, loose-lipped, motormouth, multiloquent, prolix, verbose, voluble, wordy, yacking.

**Antonyms:** restrained, silent, subdued.

**245. luminous** (*adjective*)

*The LUMINOUS paint has helped in making the road signs more clear.*

**Synonyms:** incandescent, lambent, lighted, lit, lucent, lucid, luminescent, lustrous, radiant, refulgent, resplendent, shining.

**Antonyms:** dark, dim, dull, gloomy.

**246. macabre** (adjective)

*The movie was full of MACABRE details, so it was eerie and strange.*

**Synonyms:** ghastly, ghostly, grim, grisly, gruesome, hideous, horrible, horrid, lurid, morbid, offensive, scary, terrible, unearthly, weird.

**Antonyms:** common, living, normal.

**247. magnanimous** (adjective)

*Daisy was very MAGNANIMOUS to all her friends but when she needed them, they neglected her.*

**Synonyms:** benevolent, big, bighearted, bountiful, charitable, considerate, forgiving, free, generous, greathearted, handsome

**Antonym:** petty, stingy, suspicious.

**248. maladroit** (adjective)

*It is surprising that the committee has appointed such a MALADROIT manager to oversee such a difficult job.*

**Synonyms:** floundering, gauche, halting, heavy-handed, inept, inexperienced, lumbering, stumbling, ungraceful, unhandy, unskillful.

**Antonyms:** able, capable, skillful.

**249. malignant** (adjective)

*Jane's neighbors were aware of her MALIGNANT nature, so none were ready to believe her kind gestures.*

**Synonyms:** deadly, destructive, fatal, internecine, lethal, mortal, pestilential, poisonous.

**Antonyms:** benign, harmless.

**250. malingering** (verb)

*Rosy says she has hurt her feet but we all think she is MALINGERING.*

**Synonyms:** dodge, fake, loaf, sham.

**Antonyms:** direct, guide, set.

**251. manifold** (adjective)

*Sam accepted a job for which he is not qualified, so he is facing MANIFOLD problems.*

**Synonyms:** multifarious, multifold, multiform, multiple, multiplied, multitudinous, numerous, sundry, varied, various.

**Antonyms:** one, single, sole.

**252. masquerade** (noun)

*Our MASQUERADE as journalists went unnoticed as we managed to disguise ourselves well.*

**Synonyms:** circus, cloak, color, costume, cover, deception, dissimulation, facade, festivity, front, guise, impersonation, imposture, mask.

**253. melancholy** (adjective)

*James's MELANCHOLY was visible even amidst the cheerful crowd.*

**Synonyms:** crestfallen, crummy, dejected, desolate, despondent, destroyed, disconsolate, dispirited, down, downcast.

**Antonyms:** encouraged, expectant, hopeful.

**254. mitigate** (verb)

*We tried our best to MITIGATE Sara's sorrow but she was too crestfallen.*

**Synonyms:** lessen, meet halfway, moderate, modify, mollify, pacify, palliate, placate, quiet, reduce, relieve, remit, soften, soothe, subdue, temper, tone down.

**Antonyms:** incite, increase, intensify, irritate, worsen.

**255. morbid** (*verb*)

The **MORBID** details published in the newspaper worsened the situation.

**Synonyms:** ghastly, gruesome, hideous, horrid, infected, irascible, macabre, malignant, melancholy, monstrous, moody, pessimistic, saturnine, sick, somber, sullen, unhealthy, unnatural, unsound, unusual.

**Antonyms:** happy, healthy, pleased, sound.

**256. murky** (*adjective*)

Sally kept her **MURKY** secrets from her parents.

**Synonyms:** foggy, foul, fuzzy, glowering, gray, grubby, impenetrable, lowering, misty, mucky, muddy, nasty, nebulous, overcast, sad, smoky, somber, squalid, stormy, tenebrous, turbid, unclean.

**Antonyms:** bright, clear, light, luminous, sparkling.

**257. myriad** (*adjective*)

The reformer's **MYRIADS** of followers joined his fight against corruption.

**Synonyms:** infinite, multiple, multitudinous, no end of, numberless, thousand-and-one, uncounted, untold, variable.

**Antonyms:** limited, measurable.

**258. naïve** (*adjective*)

The new employee was **NAÏVE**, so believed the promises made by his boss.

**Synonyms:** mincing, naïve, teenage, unsophisticated, young.

**Antonyms:** mature, sophisticated.

**259. nefarious** (*adjective*)

After a tough chase, the police were able to capture the **NEFARIOUS** criminal.

**Synonyms:** flagrant, foul, glaring, gross, heinous, horrible, infamous, infernal, iniquitous, miscreant, monstrous, opprobrious, outrageous, perverse, putrid, rank, rotten, shameful, treacherous, vicious, vile, villainous, wicked.

**Antonyms:** honorable, respectable, virtuous, worthy.

**260. newfangled** (*adjective*)

I am fond of **NEWFANGLED** gadgets and never slip an opportunity to buy one.

**Synonyms:** fashionable, fresh, gimmicky, in vogue, modern, modernistic, neoteric, new, new-fashioned, novel, popular, unique.

**Antonyms:** old hack, old-fashioned, outmoded.

**261. nonplus** (*verb*)

The intelligent students were **NONPLUSSED** with the professor's illogical explanation of the theory.

**Synonyms**

astound, baffle, balk, beat, bewilder, confound, daze, discomfit, disconcert, discountenance, dismay, dumbfound, embarrass, faze, fluster, frustrate.

**Antonyms:** educate, enlighten, explain.

**262. novice** (*noun*)

Although Glory is a **NOVICE** to the field, she performed as if she were a seasoned player.

**Synonyms:** neophyte, newcomer, novitiate, probationer, proselyte, pupil, recruit, rookie, starter, student, tenderfoot, trainee.

**Antonyms:** expert, professional.

**263. noxious** (*adjective*)

The **NOXIOUS** gases proved to be deadly; many succumbed.

**Synonyms**

*insalubrious, noisome, pernicious, pestiferous, pestilent, poisonous, putrid, sickly, spoiled, stinking, toxic, unhealthy, unwholesome, venomous, virulent.*

**Antonyms:** *healthy, helpful, hygienic, pure, sterile.*

**264. notorious** (*adjective*)

The airlines with which you have booked your ticket on, is **NOTORIOUS** for last minute cancellations.

**Synonyms:** *infamous, leading, noted, obvious, opprobrious, overt, patent, popular, prominent, questionable, scandalous, shady, shameful, undisputed, wanted, well-known, wicked.*

**Antonyms:** *obscure, unimportant, unknown, unremarkable.*

**265. nugatory** (*adjective*)

Nobody took Sandy's **NUGATORY** suggestions seriously.

**Synonyms:** *inconsequential, insignificant, piddling, trifling, useless.*

**Antonyms:** *effective, fruitful, productive, sufficient.*

**266. obdurate** (*adjective*)

In spite of all my requests not to cancel my application, the clerk remained **OBDURATE**.

**Synonyms:** *dogged, firm, fixed, hard, harsh, heartless, immovable, implacable, indurate, inexorable.*

**Antonyms:** *gentle, submissive, susceptible, yielding.*

**267. obloquy** (*noun*)

Bunny's **OBLOQUY** against his parents shows his scant respect for them.

**Synonyms:** *aspersion, censure, criticism, defamation, disgrace, humiliation, ignominy, insult, invective, reproach, slander, vituperation.*

**Antonyms:** *happiness, kindness, mildness.*

**268. obsequious** (*adjective*)

Randy's **OBSEQUIOUS** behavior earned him little respect from his colleagues.

**Synonyms:** *beggarly, complacent, compliable, cringing, crouching, deferential, enslaved, fawning, flattering, ingratiating, menial, obeisant.*

**Antonyms:** *assertive, brazen, confident, presumptuous.*

**269. opprobrium** (*noun*)

Foster never imagined that his senseless behavior could cause his family to suffer such vicious **OPPROBRIUM**.

**Synonyms:** *discredit, dishonor, disrepute, disrespect, humiliation, ignominy, ill repute, infamy, loss of honor, obloquy, shame, stain, stigma, tarnish.*

**Antonyms:** *regard, respect.*

**270. opulent** (*adjective*)

I love partying and leading a very **OPULENT** life.

**Synonyms:** *lavish, luscious, luxuriant, moneyed, ostentatious, palatial, plentiful, plush, pretentious, prodigal, profusive, prolific.*

**Antonyms:** *depressed, destitute, poor.*

**271. ostentation** (*noun*)

Most of the invitees were stunned with the *OSTENTATION* of wealth.

**Synonyms:** boast, boasting, brag, bragging, demonstration, display, exhibition, false front, flamboyance, flaunting, flourish, fuss, garishness, grandstand play, magnificence.

**Antonyms:** plainness, quiet, reservation.

**272. outlandish** (*adjective*)

I really can't imagine doing something so *OUTLANDISH* as I have always led a simple life.

**Synonyms:** eccentric, erratic, exotic, extravagant, fantastic, gauche, graceless, grotesque, outrageous, peculiar, preposterous, quaint, queer, ridiculous, rude, singular, tasteless, unconventional, uncouth, unheard-of, unorthodox, unusual, weird, whimsical, wild.

**Antonyms:** familiar, normal, ordinary, usual.

**273. overt** (*adjective*)

There were no *OVERT* signs that the manager was going to be replaced.

**Synonyms:** definite, manifest, observable, open, patent, plain, public, undisguised, visible.

**Antonyms:** hidden, private, secret.

**274. palliate** (*verb*)

Sally's condition *PALLIATED* after the doctor had changed her medicines.

**Synonyms:** justify, lessen, lighten, make light of, mask, minimize, mitigate, moderate, mollify, qualify, quick fix, relieve, screen, soften, soothe, sugarcoat, temper; varnish, veil, veneer, vindicate.

**Antonyms:** accuse, blame, condemn.

**275. parsimonious** (*adjective*)

Sam's *PARSIMONIOUS* nature reached its height when he refused to spend money for his own treatment.

**Synonyms:** close, frugal, greedy, illiberal, mean, miserly, penurious, prudent, saving, selfish, skinflint, sparing.

**Antonyms:** generous, lavish, liberal.

**276. pedestrian** (*adjective*)

The audience criticized the *PEDESTRIAN* performance of the actors in the play.

**Synonyms:** banal, boring, commonplace, dim, dreary, flat, inane, jejune, mediocre, monotone, monotonous, mundane, ordinary, platitudinous, plodding, prosaic, unimaginative, uninspired, uninteresting.

**Antonyms:** different, exceptional, extraordinary, interesting.

**277. peevish** (*adjective*)

Katy is composed in her behavior but her brother is *PEEVISH*.

**Synonyms:** grouchy, grousing, growling, grumpy, huffy, ill-natured, mean, morose, obstinate, pertinacious, petulant, querulous, short-tempered, snappy, splenetic, sulky, sullen, surly, ugly, waspish, whining.

**Antonyms:** friendly, happy, pleasant.

**278. pejorative** (*adjective*)

Many women were peeved with Bob's *PEJORATIVE* remarks against single mothers.

**Synonyms:** depreciatory, derisive, derogatory, detracting, detractive, disadvantageous, disparaging, irreverent, rude, slighting, uncomplimentary, unpleasant.

**Antonyms:** complimentary, positive, praising.

**279. pellucid** (*adjective*)

The professor provided such PELLUCID examples to prove his point that the other researchers had no choice but to fall in line.

**Synonyms:** comprehensible, explicit, limpid, luminous, plain, simple, translucent, transparent.

**Antonyms:** foggy, obscured, smudged.

**280. penury** (*noun*)

Catherine lived in PENURY after she had lost the legal battle for her property.

**Synonyms:** dearth, destitution, indigence, insufficiency, need, privation, scantiness.

**Antonyms:** affluence, wealth.

**281. perfidy** (*noun*)

Weill's PERFIDY towards those who were always loyal to him is unpardonable.

**Synonyms:** sellout, treacherousness, treason, two-timing.

**Antonyms:** loyalty, protection, support.

**282. petulant** (*adjective*)

I could not tolerate my son's PETULANT insolence in front of my friends.

**Synonyms:** grouchy, grumbling, huffy, ill-humored, impatient, irritable, mean, peevish, perverse, pouting, querulous, snappish, sour, sulky, sullen, testy, touchy, ungracious, waspish, whining, whiny.

**Antonyms:** happy, pleasant.

**283. pivotal** (*adjective*)

Although he entered the organization at a very low level, now he holds a PIVOTAL position.

**Synonyms:** determining, essential, focal, middle, momentous, overriding, overruling, principal, ruling, vital.

**Antonyms:** unimportant, unsubstantial.

**284. prejudice** (*verb*)

By the end of the game, it was obvious that the umpire was PREJUDICED towards the home team.

**Synonyms:** misjudgment, narrow-mindedness, one-sidedness, partiality, pique, preconception, prejudgment, prepossession, racism, repugnance, revulsion, umbrage, unfairness.

**Antonyms:** justice, regard, respect, tolerance.

**285. prevaricate** (*verb*)

I advised my daughter not to PREVARICATE when we discuss important issues.

**Synonyms:** fib, garble, hedge, invent, misrepresent, misspeak, palter, quibble, shift, shuffle.

**Antonyms:** tell the truth.

**286. pristine** (*adjective*)

The PRISTINE location enhanced our peace of mind.

**Synonyms:** refined, sanitary, snowy, spotless, stainless, sterile, sterilized, taintless, unadulterated, uncorrupted, unpolluted, unsoiled, unspotted, unstained, unsullied, untainted, untarnished, untouched.

**Antonyms:** final, last.

**287. proclivity** (*noun*)

We noticed her PROCLIVITY to dramatics even as a child.

**Synonyms:** inclining, leaning, liableness, penchant, predilection, predisposition, proneness, propensity.

**Antonyms:** disinclination.

**288. profound** (*adjective*)

The youngster's **PROFOUND** knowledge in philosophy astonished the elders.

**Synonyms:** learned, mysterious, occult, penetrating, philosophical, recondite, reflective, sagacious, sage, scholarly, secret, serious, shrewd, skilled, subtle.

**Antonyms:** ignorant, stupid.

**289. proliferate** (*verb*)

Pests like cockroaches **PROLIFERATE** if they are not controlled in the beginning.

**Synonyms:** grow rapidly, multiply, mushroom, procreate, propagate, reproduce, run riot, snowball.

**Antonyms:** decline, decrease, fall off.

**290. prolix** (*adjective*)

Harry's speech was so **PROLIX** that the listeners failed to understand the main points.

**Synonyms:** diffuse, lengthy, rambling, tedious, verbose, windy.

**Antonyms:** needing, needy, poor, rare, scarce, wanting.

**291. prudent** (*noun*)

In spite of **PRUDENT** planning, the mission failed to succeed.

**Synonyms:** playing safe, politic, provident, reasonable, sagacious, sage, sane, shrewd, sound, sparing, tactical, thrifty, vigilant, wary.

**Antonyms:** imprudent, incautious, unwise.

**292. puerile** (*adjective*)

I did not expect such a **PUERILE** comment from a sagacious person like John.

**Synonyms:** jejune, juvenile, naive, petty, ridiculous, silly, trivial, unfledged, weak, young.

**Antonyms:** adult, mature.

**293. punctilious** (*adjective*)

The junior player was more **PUNCTILIOUS** than the senior player.

**Synonyms:** meticulous, nice, observant, painstaking, particular, precise, proper, punctual.

**Antonyms:** easy-going, informal, uncaring.

**294. quaint** (*adjective*)

Now that I know the whole story, my fears seem almost **QUAINT**.

**Synonyms:** funny, idiosyncratic, laughable, oddball, off the beaten track, offbeat, original, outlandish, peculiar, queer, singular, special, unusual, whimsical.

**Antonyms:** conventional, regular, usual.

**295. quiescent** (*adjective*)

Even the normally **QUIESCENT** workers were stirred to protest by this flagrant disregard for the safety measures.

**Synonyms:** inert, inoperative, latent, motionless, passive, quiet, slumbering, stagnant, still.

**Antonyms:** active.

**296. rapacious** (*adjective*)

Man's **RAPACIOUS** greed is causing immense damage to nature and ultimately he will have to pay for it.

**Synonyms:** furious, greedy, marauding, murderous, predatory, preying, ravenous, savage, voracious.

**Antonyms:** calm, easy-going, laid-back.



**297. ravishing** (*adjective*)

The actresses' **RAVISHING** beauty stunned the audience and held them spellbound.

**Synonyms:** draw, enrapture, enthrall, entrance, fascinate, hold, hypnotize, magnetize, mesmerize, overjoy, please, trance, transport

**Antonym:** disenchant, repulse, turn off.

**298. recalcitrant** (*adjective*)

The management had no choice but to terminate the **RECALCITRANT** worker.

**Synonyms:** insubordinate, intractable, obstinate, opposing, rebellious, refractory, stubborn, undisciplined, ungovernable, unmanageable, unruly.

**Antonyms:** amenable, obedient, passive.

**299. redolent** (*adjective*)

To make fish fry in the small kitchen was a bad idea because it left behind a **REDOLENT** smell.

**Synonyms:** balmy, evocative, fragrant, odoriferous, perfumed, pungent, remindful, reminiscent.

**Antonyms:** putrid, stale, stinking.

**300. relentless** (*adjective*)

Fredrick praised his parents for their **RELENTLESS** efforts in keeping the family together in spite of all odds.

**Synonyms:** dogged, ferocious, fierce, grim, hang in, hang-tough, implacable, inexorable, inflexible, inhuman, mortal, obdurate.

**Antonyms:** merciful, sympathetic, understanding.

**301. replenish** (*verb*)

At any given time there was no shortage of food because the authorities concerned **REPLENISHED** the stock time to time.

**Synonyms:** provide, provision, refill, refresh, reload, renew, replace, restock, restore, top.

**Antonyms:** deplete, use up, waste.

**302. rudimentary** (*adjective*)

The man at the desk was so uninformed that he could not provide us even the **RUDIMENTARY** information about the event.

**Synonyms:** embryonic, immature, initial, introductory, primary, primitive, simple, simplest, uncompleted, undeveloped, vestigial.

**Antonyms:** derivative, developed, extra, non-essential.

**303. sacrosanct** (*adjective*)

For me, my freedom is **SACROSANCT** and I am not ready to sacrifice it at any cost.

**Synonyms:** pure, religious, revered, sacramental, saintly, sanctified, spiritual, unprofane, venerated.

**Antonyms:** profane, unhallowed, unholy, unsanctified.

**304. sagacity** (*noun*)

Roger is known for his **SAGACITY**; how could he make such a bad judgment.

**Synonyms:** enlightenment, experience, foresight, good judgment, insight, intelligence, judgment, knowledge, levelheadedness, perceptiveness, perspicacity, practicality, prudence, sageness, shrewdness, understanding.

**Antonyms:** naievety, senselessness, stupidity.



**305. salutary** (*adjective*)

The SALUTARY climate on the hill station proved to be healthy.

**Synonyms:** aiding, beneficial, fit, good, healing, healthful, nourishing, nutritious, restorative, salubrious, sound, tonic, well, wholesome.

**Antonym:** hurtful, harmful.

**306. sardonic** (*adjective*)

The comedian's SARDONIC jokes were not received well and soon the crowd started booing him.

**Synonyms:** disrespectful, evil, irascible, mean, mocking, mordant, nasty, offensive, salty, satirical, scorching, scornful, sharp, smart-alecky, sneering, taunting.

**Antonyms:** content, genial, kind, nice, pleasant, sweet.

**307. sane** (*noun*)

Terry was SANE, so he was able to control the irate crowd without any problem.

**Synonyms:** balanced, discerning, healthy, intelligent, judicious, levelheaded, logical, lucid, moderate, normal, prudent, rational, sagacious, sensible, sober, sound, steady.

**Antonyms:** crazy, insane, unreasonable, unsound, unstable.

**308. sedentary** (*adjective*)

James was obese and his SEDENTARY job caused further health problems.

**Synonyms:** idle, inactive, seated, settled, sitting, sluggish, stationary, torpid.

**Antonyms:** active, energetic, mobile, moving.

**309. serendipity** (*noun*)

It is a SERENDIPITY that the couple won a huge amount from the lottery ticket that they purchased.

**Synonyms:** fluke, good luck, happy chance, luck, luckybreak, stumbling upon, tripping over.

**Antonyms:** free will, volition.

**310. simulated** (*adjective*)

The scientists decided to develop a new model as the current model is not able to realistically SIMULATE cyclones.

**Synonyms:** exaggerate, fabricate, fake, favor, feature, feign, fence, gloss over, invent lie, lift, make believe, mimic, mirror, misrepresent, phony.

**Antonyms:** be real.

**311. snide** (*adjective*)

The author's SNIDE references about leading politicians in his new novel received a lot of criticism from the readers.

**Synonyms:** disparaging, hurtful, insinuating, malicious, mean, sarcastic, scornful, sneering, spiteful, unkind.

**Antonyms:** kind, lovable, loving, nice.

**312. solicitous** (*adjective*)

Randy's SOLICITOUS remarks were misunderstood by his entire family.

**Synonyms:** avid, beside oneself, careful, caring, concerned, devoted, eager, earnest, heedful, impatient, keen, loving, mindful, raring, regardful, tender, thirsty, troubled.

**Antonyms:** laid-back, unafraid, unworried.

**313. splenetic** (adjective)

*Even small incidents upset Sam; he is rightly judged to be a SPLENETIC.*

**Synonyms:** indignant, irascible, irate, ireful, mad, mordant, peevish, petulant, rancorous, sarcastic, sharp, spiteful, splenetic, tart, testy, trenchant, wrathful.

**Antonyms:** kindly, peaceable.

**314. sporadic** (adjective)

*Initially the protests against the new law were SPORADIC but soon spread like a fire.*

**Synonyms:** occasional, random, rare, scarce, scattered, seldom, semioccasional, spasmodic, spotty, uncommon, infrequent.

**Antonyms:** continuous, dependable.

**315. spurious** (adjective)

*The SPURIOUS drug manufacturer was at last nabbed by the police and remanded to custody.*

**Synonyms:** ersatz, faked, false, feigned, forged, framed, illegitimate, artificial, assumed, bent, bogus, bum, contrived, deceitful.

**Antonyms:** authentic, genuine, real, true.

**316. subjugate** (verb)

*Zion tried his best to SUBJUGATE the protest against him but failed.*

**Synonyms:** kick around, overcome, overthrow, put down, quell, reduce, subdue, suppress, tame, triumph.

**Antonyms:** free, liberate.

**317. succumb** (verb)

*The government did not SUCCUMB to the pressure tactics adopted by the opposition.*

**Synonyms:** accede, bow, break down, buckle, capitulate, cave, cave in, cease, collapse.

**Antonyms:** conquer, create, overcome, win.

**318. suffuse** (verb)

*When the criminal saw the police, fear SUFFUSED him.*

**Synonyms:** cover, fill, interject, introduce, overspread, permeate, saturate, spread, steep, tinge.

**Antonyms:** pale, whiten.

**319. supercilious** (adjective)

*The SUPERCILIOUS reaction from Moses was a clear indication that he was not going to support our cause.*

**Synonyms:** imperious, insolent, lofty, nervy, overbearing, patronizing, proud, putting on airs, scornful, snobby, superior, uppity, vainglorious.

**Antonyms:** modest, humble.

**320. sympathetic** (adjective)

*Kate's SYMPATHETIC attitude won her many friends.*

**Synonyms:** affectionate, appreciating, benign, benignant, caring, commiserating, compassionate, comprehending, condoling, considerate, interested, kind, kindhearted, kindly, loving, pitying, responsive, sensitive, supportive, tender, thoughtful.

**Antonyms:** callous, merciless, uncaring, unconcerned, unfeeling, unsympathetic.

**321. taciturn** (*adjective*)

Lawrence is TACITURN but his brother speaks a lot.

**Synonyms:** mum, mute, quiet, reserved, reticent, sententious, silent, sparing, speechless, tight-lipped, unexpressive, unforthcoming, withdrawn.

**Antonyms:** fluent, talkative, wordy.

**322. tactful** (*adjective*)

All the TACTFUL moves that Susan made led to her success.

**Synonyms:** polite, politic, prudent, sensitive, skilled, skillful, suave, subtle, sympathetic, tactical, understanding, urbane, wise.

**Antonyms:** indiscreet, tactless, unthoughtful.

**323. tardy** (*adjective*)

Parents were hoping that the new director will address the TARDY behavior of his staff.

**Synonyms:** jammed, laggard, loitering, not arrived, not done, overdue, procrastinating, retarded, slack, slow, sluggish, unpunctual.

**Antonyms:** prompt, punctual, ready.

**324. temerity** (*noun*)

Most workers did not have the TEMERITY to question the decision made by their boss even when they knew he was not right.

**Synonyms:** indiscretion, intrepidity, intrusiveness, overconfidence, pluck, precipitancy.

**Antonyms:** caution, cowardice, forethought, hesitation.

**325. thrifty** (*adjective*)

I am happy that circumstances of life have at last taught Bob to be THRIFTY.

**Synonyms:** conserving, frugal, mean, parsimonious, penny-pinching, preserving.

**Antonyms:** spendthrift, uneconomical, wasteful.

**326. timorous** (*adjective*)

Taking advantage of foster's TIMOROUS nature; his cousin cheated him of all his property.

**Synonyms:** fainthearted, fearful, hesitant, meek, shrinking, shuddering, shy, tentative, timid, tremulous, unassertive.

**Antonyms:** bold, brazen, forthcoming.

**327. travesty** (*adjective*)

New music is making a TRAVESTY of the old; it is a pity.

**Synonyms:** caricature, distortion, exaggeration, farce, lampoon, lampoonery, mimicry, mock.

**Antonyms:** seriousness, solemnity.

**328. tutelage** (*noun*)

I had an opportunity to work under the direct TUTELAGE of the experienced director; it sharpened my skills.

**Synonyms:** guidance, instruction, lesson, preparation, protection, schooling, supervision, training, tutoring.

**Antonyms:** ignorance.

**329. tyranny** (*noun*)

*Napoleon's TYRANNY did not last long; soon a revolution broke out in the country.*

**Synonyms:** absolutism, authoritarianism, autocracy, coercion, cruelty, despotism, domination, fascism, imperiousness, monarchy, oligarchy, oppression, peremptoriness, terrorism, totalitarianism.

**Antonyms:** democracy.

**330. ubiquitous** (*adjective*)

*Citizens who live in a modern society have become UBIQUITOUS to the term 'terrorism'.*

**Synonyms:** omnipresent, pervasive, universal, wall-to-wall.

**Antonyms:** rare, scarce.

**331. uncanny** (*adjective*)

*The artists have UNCANNY ways of exhibiting their talents.*

**Synonyms:** miraculous, mysterious, mystifying, prodigious, queer, remarkable, scary, secret, singular, supernatural, unearthly, unnatural, weird.

**Antonyms:** earthly, natural, usual.

**332. uncouth** (*adjective*)

*Harry is UNCOUTH and his behavior is intolerable.*

**Synonyms:** cheap, clownish, coarse, crass, crude, discourteous, disgracious, graceless, gross, heavy-handed, ill-bred, ill-mannered, impertinent.

**Antonyms:** couth, cultivated, polished, refined, sophisticated.

**333. unctuous** (*adjective*)

*His UNCTUOUS praise fell hollow on the ears of the listeners; they guessed he was insincere.*

**Synonyms:** fatty, greasy, oleaginous, slick.

**Antonyms:** blunt.

**334. usurp** (*verb*)

*The vice-chairman of the organization is trying to USURP the power of the chairman.*

**Synonyms:** displace, grab, grab hold of, high jack, infringe upon, preempt, seize, squeeze in, supplant, swipe, take, wrest.

**Antonyms:** relinquish, surrender.

**335. venerate** (*verb*)

*Sam is a kind-hearted man; people VENERATE him.*

**Synonyms:** hallow, hold in awe, honor, idolize, look up to, love, put on a pedestal, regard, respect, reverence, think highly of, treasure, value, worship.

**Antonyms:** despise, detest, hate.

**336. veracious** (*adjective*)

*Glory's VERACIOUS character made her a prime witness in the case.*

**Synonyms:** righteous, straight-arrow, straightforward, strict, true-blue, trustworthy, truthful, undeceptive, up front, valid, veridical.

**Antonyms:** false, untrue.

**337. vicissitudes** (*noun*)

*Larry will not be able to survive the VICISSITUDES of the marketplace because he is too naive.*

**Synonyms:** mutation, novelty, permutation, progression, reversal, revolution, shift, sport, switch, switchover, transposition, turnaround, uncertainty, ups and downs, variation, variety.

**Antonyms:** stability, stagnation.

**338. vindictive** (*adjective*)

The governor's **VINDICTIVE** stand surprised even his ardent supporters.

**Synonyms:** merciless, rancorous, relentless, resentful, retaliatory, ruthless, spiteful, unforgiving, unrelenting, vengeful, venomous, wreakful.

**Antonyms:** helpful, kind, nice.

**339. vitriolic** (*adjective*)

Daniel could not digest the **VITRIOLIC** remarks of his good friend Tarry.

**Synonyms:** biting, bitter, burning, caustic, corrosive, cutting, harsh, sharp.

**Antonyms:** kind, nice.

**340. vituperation** (*noun*)

The local paper was full of **VITUPERATION** against the concept of live-in relationship.

**Synonyms:** insults, libel, obloquy, reprimand, reproach, scolding, slander, tirade, upbraiding, verbal abuse.

**Antonyms:** happiness, kindness, mildness.

**341. wallow** (*verb*)

After he lost his job, Vendy seems to **WALLOW** in self-pity.

**Synonyms:** sprawl, stagger, stumble, sway, toss, totter, tumble, wade, welter.

**Antonyms:** do well, succeed.

**342. whimper** (*verb*)

The abandoned dog **WHIMPERED** the whole night.

**Synonyms:** fuss, mewl, moan, object, pule, snivel, sob, weep, whine.

**Antonyms:** bawl.

**343. whimsical** (*adjective*)

Foster felt that his wife's action was much more **WHIMSICAL** than his daughter's.

**Synonyms:** arbitrary, capricious, chancy, chimerical, comical, curious, dicey, droll, eccentric, erratic, fantastic.

**Antonyms:** reasonable, sensible.

**344. wrangle** (*verb*)

The **WRANGLE** over the control of the area has now turned into a major dispute.

**Synonyms:** controversy, disagreement, dispute, exchange, falling-out, flap, fracas, hassle.

**Antonyms:** agreement, peace.

**345. yammer** (*verb*)

My daughter's constant **YAMMER** in the middle of the night was annoying.

**Synonyms:** complain, fuss, gripe, grumble, howl, moan, repine, wail, whimper, yowl.

**Antonyms:** whimper.

**346. yearn** (*verb*)

Even as a child I had always **YEARNED** for attention; I was an adopted child.

**Synonyms:** ache, be desirous of, be eager for, be passionate, chafe, covet, crave, dream, hanker, have a crush on, hunger, itch, languish, long, lust, pine, set one's heart on, thirst, want, wish for.

**Antonyms:** dislike, hate.

**347. youthful** (*adjective*)

*His YOUTHFUL approach to solving the problem brought a fresh outlook to the whole scene.*

**Synonyms:** *active, adolescent, boyish, budding, buoyant, callow, childish, childlike, enthusiastic, fresh, full of life, inexperienced, infant, juvenile, keen, pubescent, puerile, tender, underage, vernal, vigorous, young.*

**Antonyms:** *experienced, mature, old.*

**348. zeal** (*noun*)

*Gody's ZEAL was such that soon her languid team became as enthusiastic as she was.*

**Synonyms:** *gusto, hustle, inclination, initiative, intensity, intentness, keenness, mania passion, perseverance, push, readiness, sincerity, spirit, stick-to-itiveness, urgency, vehemence, verve, warmth, yen, zest.*

**Antonyms:** *apathy, indifference, lethargy.*

**349. zenith** (*noun*)

*It is so sad that Brown died in a car accident when he was at the ZENITH of his career.*

**Synonyms:** *crown, culmination, elevation, eminence, height, high noon, highpoint, meridian, payoff, peak, pinnacle, roof, summit, tiptop, topper, vertex.*

**Antonyms:** *bottom, nadir.*

**350. zest** (*noun*)

*John's ZEST for life is seen in all his activities; he is so positive.*

**Synonyms:** *bite, body, charm, flavoring, get-up-and-go.*

**Antonyms:** *blandness, dullness.*

# CHAPTER 13

## Roots and Prefixes

Root/ Prefix	Example Words	Meaning
1. a/ an = not, without	atheist atypical anonymous apathy atrophy anomaly agnostic	one who denies the existence of God not typical; irregular of unknown name or origin lack of emotion or concern the degeneration of a body part deviation from the general rule; irregularity a person who believes that it is not possible to know about the existence of God
2. ab / abs = off, away from, apart, down	abstract abnormal abdicate  abstinence  abduct abhor abolish abstruse	intangible; theoretical deviating from the normal to formally renounce or relinquish power, throne or responsibility the act of refraining from an action or from the use of something (food, drink, etc.) take by force or secrecy; kidnap hate; loath remove; do away with something difficult to understand; mysterious
3. ac / acr = sharp, bitter	acid acrimonious acute acerbic exacerbate	sharp or bitter in taste or smell bitter in nature sharp; intelligent sour or bitter in taste; harsh worsen; aggravate

Root/ Prefix	Example Words	Meaning
4. al / ali / alter = other, another	alibi	the excuse given by an accused person that he was elsewhere at the time a crime was committed
	alternative	choice
	alias	an assumed name
	alien	stranger; foreigner
	alter ego	a second self; a close friend
5. am/ami = love	altruist	an unselfish person who cares for the welfare of others
	amenable	agreeable; manageable
	amorous	of or pertaining to love, esp. sexual love
	amity	a state of harmony; friendship
	amiable	agreeable or friendly personal qualities
6. ambi / amph = both, more than one	amateur	one who engages in an activity for pleasure rather than for financial benefit
	amicable	characterized by goodwill or friendliness
	ambidextrous	able to use both hands equally well
	ambiguous	unclear; having more than one possible meaning
	amphibian	any cold-blooded vertebrate that can stay in both water and land
7. anim = of the life, mind, soul, spirit	ambivalent	the simultaneous existence of two conflicting emotions
	magnanimous	generous and noble; forgiving esp. an insult or injury in complete agreement
	unanimous	a feeling of strong dislike or hatred
	animosity	a feeling of intense dislike
	animus	strong dislike or enmity
8. ante = before	equanimity	calmness or stability of temper
	animated	lively; full of vivacity and spirit
	antebellum	of or during the period before a war (esp.) American Civil War
	anterior	positioned before or towards the front
	antecedent	being before an event
9. anti = against	antediluvian	belonging to the period before the great biblical flood; very old or outdated
	antipathy	a feeling of intense hatred
	antipodal	of or relating to diametrically opposite points on the earth's surface
	antibody	a protein present in blood serum that protects against the toxic effects of antigens
	antidote	a remedy that neutralizes the effects of poison, disease, etc.



Root/ Prefix	Example Words	Meaning
10. anthro / andr = man, human	misanthrope	one who dislikes or distrusts human beings in general
	philander	to flirt
	androgynous	possessing both male and female characteristics
	anthropology	the science that deals with the origin of mankind
	android	a robot resembling a human being
11. arch / archi / archy = chief, principal,	monarch	a sovereign head of state; a head of state who has all the powers
	anarchy	a state of general lawlessness and disorder
	oligarchy	government by a small, select group of people
	architect	any planner or creator of anything
	matriarchy	any society dominated or ruled by women
12. ben, bon = good	bonus	an extra dividend paid to shareholders out of profits; something extra
	beneficial	causing a good result; advantageous
	benefactor	a person who supports or helps another person or people in general
	benevolent	generous; intending or showing goodwill
13. belli = war	rebellious	showing a tendency to resist authority
	bellicose	ready to fight; aggressive
	belligerent	inclined to fight or argue
15. cap/capit/cipit = head, headlong	disciple	a follower of the teachings of a teacher or a school of thought
	capital	the main city or town from where a government functions
	precipitate	to make (something) happen prematurely or sooner than expected
	precipice	the steep or vertical face of a cliff
	capitulate	surrender unconditionally or on specific terms
	caption	a title or heading that serves as the main statement of a writing
	decapitate	behead

Root/ Prefix	Example Words	Meaning
16. co/col/com/con = with, together	compatible collide collaborate conciliate commensurate connect coerce	able to exist together harmoniously strike with a violent impact to work with another or others on a joint project to overcome the hostility of having the same extent or measure, proportionate to link to compel someone to do a task by using force or authority
17. culp = blame	inculcate exculpate culprit culpable	blame someone with a fault to free from blame or guilt a person held guilty for an offense deserving censure; blameworthy
18. dys/dis, dif = faulty, bad, not, apart	dyslexia dyspepsia dysfunctional discord difference	a reading disorder indigestion not functioning normally lack of agreement or harmony the state or quality of being unlike
19. de = down, away	debase decadent descent derogatory debilitate	lower in quality, value or dignity characterized by decay or decline, deteriorating go down intentionally offensive or belittling to make feeble; weaken
20. eu = good, well	eulogy eugenics  euthanasia  euphony euphemism  euphoria	high praise or commendation science that deals with the improvement of hereditary qualities of a race or breed an act of putting someone to death, usually someone with an incurable and painful disease, mercy killing. harmony of sound an inoffensive word or phrase used in place of an offensive or hurtful one a feeling of great joy; elation
21. fid = belief, faith	infidel confident fidelity diffident confidant	a person who has no religious belief; non-believer sure of oneself; full of self-belief loyalty not sure of oneself a close associate to whom private matters are confided

Root/ Prefix	Example Words	Meaning
22. frag, fract = to break	fragile infraction fractious fracture fragment	able to be broken easily to violate or break a rule irritable; unruly; tending to break rules to break or crack a broken or incomplete part
23. gen = birth, creation, race, kind	gender carcinogenic congenital  progeny engender generous genetics	any of the categories of sex: masculine or feminine any substance that causes cancer denoting or relating to any condition existing from birth  a result or an outcome; offspring; descendants give rise to; produce unselfish; liberal in giving the branch of biology concerned with the study of genes and heredity
24. gn / gno = know	recognize incognito prognosis diagnose ignorant ignoramus cognizable	to accept or be aware of under an assumed name or appearance a forecast about the future course of a disease to determine by diagnosis; identify lacking knowledge; unaware a person without knowledge, uninformed capable of being recognized or heard in a court of law
25. grad / gress = to step	digress egress regress progress aggressive degrade	to depart from the main subject in speech or writing also called egression the act of going or coming out to return or revert, move forward to a better state, quarrelsome or belligerent to reduce in worth
26. grat = pleasing	gratuity gracious grateful ingratiate gratify	money given as token of appreciation to show kindness, courtesy and mercy show gratitude; feel thankful to get one's favor to please or satisfy someone

Root/ Prefix	Example Words	Meaning
27. im / in / em / en = in, into not, without	enclose engorge intrinsic influx implicit  embrace incarnate indigenous impartial indigent inactive innocuous indolence	to close from all sides, surround to swallow in large amounts, glut relating to an essential basic element, built-in the mass arrival or entry or incoming unquestioning, not expressed directly but understood  to hug, accept willingly and eagerly to give a human form existing or occurring in a natural form, intrinsic fair, unbiased, favoring neither lacking the basic necessities of life, impoverished not active or operational, idle, unused harmless, inoffensive the state of doing nothing, lazy; sloth
28. jac, jact, jec = to throw	eject projectile  trajectory  ejaculatory	compel to leave, evict an object propelled in air especially a weapon; hurled forward the course or path taken by a moving object in space especially that of a projectile constituting an abrupt brief utterance, exclamation
29. loqu, locut = to talk	eloquent soliloquy loquacious elocution	persuasive and powerful discourse, articulate a dramatic act of speaking to oneself aloud tendency to be wordy, talkative, garrulous the art of speaking in public, oratory
30. mag / maj / max = big	magnate  magnanimous maxim  magnificent magnify  magnitude	a person of great importance and influence, esp in business or industry.  generous in forgiving, noble in thought and heart a rule or guide, an expression accepted as truth or principle grand, splendid, extraordinary to glorify or praise, to enlarge or increase the apparent size greatness in relation to size, dimension, extent,
31. mut = change	permutation immutable commute mutation	a total change; transformation not able to modify or change; unalterable to travel, to exchange or substitute the process of being changed or altered

Root/ Prefix	Example Words	Meaning
32. nat = born	natural	produced by nature, not artificial, primitive in state, unaffected
	innate	existing since birth, inborn; congenital
	prenatal	period during pregnancy; before birth
	nativity	related to birth, place and condition; birth of Jesus
33. nov = new	innovate	to introduce or begin something new
	novice	one who is new to a task or activity, a beginner
	renovate	to make new, fix-up, upgrade the existing condition
	novelty	something original and new; innovation
34. omni = all	omnipotent	one who has unlimited power or authority
	omniscient	knowing everything, possess infinite knowledge
	omnibus	covering many things or areas
	omnipresent	existing in all places at all times; ubiquitous
	omnivorous	to have an insatiable appetite for an activity or pursuit; who eats both animal and vegetarian food
35. pac = peace	pacify	to ease the anger or agitation, make peace
	pacific	promoting peace; conciliatory
	pacifist	a belief to oppose violence or war to resolve disputes and encourage peace
36. pass = to feel	dispassionate	showing no emotion and devoid of influence; unbiased
	impassioned	filled with intense emotion
	impassive	lack of emotion; not affected or impressed
37. ped, pod/ped = foot, child	impediment	something that stops passage or entry; a hindrance
	tripod	a three-footed stand to support apparatus like camera, gun, etc
	quadruped	an animal having four feet
	pedagogue	a school teacher or instructor
38. phil = love	philanderer	to engage in brief love affairs with women; womanize
	philanthropist	one who loves humanity, serves mankind through charity and benevolent deeds
	anglophile	a person who admires England, its people and its culture

Root/ Prefix	Example Words	Meaning
39. que / quis/qui = to seek, quiet	inquisitive	curious about the affairs of others; eager for knowledge
	query	a question or inquiry; a request for data
	querulous	grumbling, continuous complaints or grievances
	perquisite	a payment or benefit received in addition to one's wages or salary;
	acquire	to obtain, come into possession of
	exquisite	appealing to refined taste; beautiful and pleasing
	conquest	one that has been captivated or overcome; triumph
	tranquil	quiet and peaceful; placid or serene
	acquiesce	to comply without protest
	quiescence	a state of calm, of being temporarily inactive
	quiet	calm; making little or no sound
disquiet	devoid of peace and rest; anxiety	
40. retro = backward	retrospect	contemplate the past; review
	retroactive	to refer to things that happened in the past, prior to the enactment of the act in vogue
	retrogress	to move backwards, usually to an inferior condition; degenerate
41. syn, sym, syl, sys = with, together	synchronize	arrange in order to occur at the same time; coincide
	sympathize	to express compassion and understand others feelings
	symmetry	harmony, proportion and uniformity
	synergy	the combined effect of two or more individuals or firms to attain a common end
42. sacr / sanct / secr = sacred	sylogism	a deductive reasoning from general to specific
	sacrament	a religious rite of Christian sacrament, the Eucharist
43. sal / sil / sault / sult = to leap, to jump	sacrilege	misuse of something holy; desecration
	sacred	regarded with respect or reverence, holy
	sacrifice	an offering to a deity, especially slaughtered animals
	sanctify	to make holy, bless
	sanction	to give official permission or approval
43. sal / sil / sault / sult = to leap, to jump	resilient	ability to recover quickly from misfortune
	insolent	rude and disrespectful
	exult	feel extreme happiness or joy, jubilate
	desultory	absence of a plan, random
	insult	to offend; treat with gross insensitivity and demean
	assault	a violent physical or verbal attack
	somersault	a complete reversal relating to opinions or sympathies
	salient	noticeable, prominent

Root/ Prefix	Example Words	Meaning
44. sci = to know	unconscionable omniscient prescient conscious conscience	beyond reason, unscrupulous one who has infinite knowledge of everything characterized by foresight; visionary aware of one's existence, alert an inner sense of right and wrong
45. scribe / scrip = to write	conscription transcript  circumscribe scribble describe script postscript  proscribe ascribe	compulsory enrollment in armed forces, induction a written, printed or typed copy of proceedings, especially legal to restrict within bounds, to encircle to draw or write hastily and carelessly represent with words or pictures handwriting, a text of a movie or play a note added towards the end of a letter, after signature to denounce or condemn, forbid to assign to a specific cause or quality
46. spec / spic / spit = to look; to see	circumspect perspicacious conspicuous specious perspective  speculation suspicious spectrum  retrospective	discreet and cautious, avoid risk and danger having clear perception and discernment easy to notice, obvious misleading, deceptively attractive the importance of matters or facts from a special point of view; outlook an opinion arrived at by guessing; conjecture showing distrust and unwilling to confide a broad sequence of related things that form a continuous series to look back, contemplate the past
47. super / sur = above	supercilious  Superfluous surmount surveillance  surpass superlative supersede supersonic	concerned with one's own superiority and importance, arrogant being beyond what is sufficient; excess to overcome, conquer carefully watch a person or group, especially observe one under suspicion to exceed or go beyond the limits of the highest quality; excellent to replace, override relating to sound greater than the speed of sound
48. trans = across	transport	to carry or go from one place to another
49. ultra = beyond, excessive	ultracritical	calculating and highly critical
50. ven/t = come	circumvent convention	to go around but not through; detour a formal meeting of members of an organization

Root/ Prefix	Example Words	Meaning
51. ver/i = truth	veracious veracity verify	conforming to truth, honest adherence to truth to establish as true and genuine
52. vers, vert = turn	introvert reverse	to turn inward, one who is interested in himself to turn or move in the opposite direction
53. viv, vit = alive	revival vivacious vitality	the act of bringing back to life full of high spirits and animation; lively intellectual or physical vigor; energy
54. xen/o = foreign	xenophobic xenogenesis	fear of foreigners production of offspring which is markedly different from either parent
55. zo/o = animal life	zoology zoid zooplankton	study of animals resembling an animal microscopic animals which move passively in aquatic ecosystems



# CHAPTER 14

## Confusing Words

### ***Confusing Words***

English language can be very confusing. Some words sound similar but have different meanings. Therefore, it is virtually impossible to stay away from making mistakes.

For instance, the words **see** and **look** are often confused. One must notice the difference in meaning. ‘See’ is to perceive while ‘look’ is to direct one’s gaze.

Unless you are familiar with words, which are often misused, because they are confusing, you are a sitting duck for bad expressions. Let’s face it, and let’s take them by the horns.

#### 1. ***Abjure/Adjure***

***Abjure:*** Renounce or repudiate.

***Adjure:*** Request earnestly.

He is a royal descendant, yet he ***abjures*** taking any titles.

In the bird sanctuary, the authorities ***adjured*** the visitors to keep away from feeding the birds.

#### 2. ***Adverse/Averse***

***Adverse:*** Antagonistic.

***Averse:*** Feeling disinclined.

I feel sad that you have passed such ***adverse*** remarks about me.

Although you are not ***averse*** to eating Thai food, you could have an ***adverse*** reaction from it.

#### 3. ***Aggravated/Aggrieved***

***Aggravate:*** Worsen.

***Aggrieved:*** Afflicted.

The medicine ***aggravated*** his illness instead of curing him.

The glaring disparity in the distribution of relief annoyed the ***aggrieved*** residents.

**4. Allusion/Illusion**

**Allusion:** Indirect or covert reference.

**Illusion:** A false belief.

He failed to understand the **allusion**, so was not hurt by the remark.

Do not be under the **illusion** that only intelligence has a role to play in one's success.

**5. Appraise/Apprise**

**Appraise:** Assess.

**Apprise:** Inform.

The prime minister asked the chief of the intelligence department to **appraise** the situation and keep him posted.

The governor was **apprised** of the deteriorating law and order conditions in the state.

**6. Chafe/Chaff**

**Chafe:** To irritate or annoy.

**Chaff:** Tease good-naturedly.

The hair on the collar **chafed** the kid.

The **chaff** turned serious and led to a fight between the two friends.

**7. Censured/Censored**

**Censure:** Disapproval.

**Censor:** Examine and act upon.

The sales woman was **censured** by the manager for her uncouth behavior with the customer.

The film  **censor** board passed strict regulations regarding abusive use of language in films.

**8. Climactic/Climatic**

**Climactic:** Relating to climax.

**Climatic:** Relating to climate.

The director of the movie appealed to the audience to keep the **climactic** scenes a secret lest it should spoil the fun of those watching the movie later.

The **climatic** conditions were such that we did not venture to move any farther.

**9. Compliment/Complement:**

**Compliment:** Praise or admiration.

**Complement:** To complete.

I passed on my **compliments** to the host for his aesthetic sense.

The furniture of the house **complements** the wall color well.

**10. Condemnation/Commendation**

**Condemnation:** Criticism or disapproval.

**Commendation:** Praising or approving.

Although I was expecting **condemnation**, I received **commendation**.

The visitor's **commendations** were taken seriously by the residents.

**11. Counsel/Council:**

**Counsel:** Advise or guide in the correct direction.

**Council:** Body of people governing something.

The **council** of ministers need some **counsel** lest they should continue to denounce their own colleagues in public.

**12. Depravation/Deprivation**

**Depravation:** The corruption of making something or someone evil.

**Deprivation:** Lacking desired or necessary items or things.

It is a political truth that the **deprivation** of a group of people may easily lead to their **depravation** and result in violence against a government.

**13. Deprecate/Depreciate**

**Deprecate:** Disapprove.

**Depreciate:** Lessen the price or value of something.

We **deprecate** the policy of the insurance company that insists that the value of our new automobile will **depreciate** significantly as soon as it is driven out of the dealership's parking lot.

**14. Diffident/Dissident**

**Diffident:** Hesitant.

**Dissident:** One who disagrees.

The leader of the **dissident** faction attending the conference displayed a surprisingly **diffident** attitude when speaking to the crowd.

**15. Discomfort/Discomfit**

**Discomfort:** Uneasiness.

**Discomfit:** Disconcert and defeat; thwart.

The ladies felt a lot of **discomfort** in their silk gowns as the weather was hot and humid.  
The collision of the ships **discomfited** the plan of a long voyage.

**16. Discrete/Discreet**

**Discrete:** Discontinuous or individually distinct.

**Discreet:** Judicious.

There is a **discrete** difference in the two neighborhoods; so, we must be **discreet** when we are talking with the local residents.

**17. Energize/Enervate**

**Energize:** Give energy.

**Enervate:** Lose vitality or energy.

The rigorous exercise has **enervated** all his energy and now he needs hot coffee to **energize** himself.

**18. Enormousness/Enormity**

**Enormousness:** Largeness or immensity.

**Enormity:** Depravity or wickedness.

Please understand the **enormousness** of the situation and act accordingly.  
The **enormities** of the management was exposed by the union.

**19. Erasable/Irascible**

**Erasable:** Can be erased.

**Irascible:** Angered; quick tempered.

My holiday experiences are so fantastic that they are not **erasable**.  
The **irascible** temper of the professor often caused fear among the students.

20. *Expedient/Expeditious*

**Expedient:** Advantageous.

**Expeditious:** Quick and efficient.

The management realized that offering a bonus to the striking workers would be *expedient* in bringing them back to work.

There was no consistency in the policies of the management, so it failed to *expeditiously* take progressive decisions.

21. *Flack/Flak*

**Flack:** Publicist.

**Flak:** Excessive or abusive criticism.

I tried to *flack* an old bike but failed miserably.

I cannot take the *flak* for something that I have not done.

22. *Flaunt/Flout*

**Flaunt:** Display ostentatiously.

**Flout:** Disobey or show contempt for.

Many people criticized her for *flaunting* her wealth.

The company is very strict about certain rules and does not spare anyone who *flouts* those rules.

23. *Fortuitous/Fortunate*

**Fortuitous:** Happening by chance or accidental.

**Fortunate:** Lucky.

A *fortuitous* event may not necessarily be a *fortunate* event.

24. *Founder/Flounder*

**Founder:** To fail completely; to fall, to sink.

**Flounder:** To move clumsily.

We saw the boat *founder* in the sea but could do nothing to save it.

The drugs had a soporific effect, so it made him *flounder*.

25. *Full/Fulsome*

**Fulsome:** Cloying, excessive, disgusting

**Full:** Abundant

The characters in her novel are passionate but never *fulsome*.

26. *Gambit/Gamut*

**Gambit:** Action intended to gain advantage.

**Gamut:** Is a full range or extent.

The chess player's expressions ran the *gamut* from fear to exhilaration as he pondered over his *gambit*.

27. *Impinge/Infringe*

**Impinge:** Causing some kind of restriction.

**Infringe:** To violate the law.

I felt that your vehement speech in favor of a strike vote was an attempt to *infringe* on my right to make my own decisions, since, such a vote would no doubt *impinge* on my ongoing employment.

**28. *Imply/Infer***

***Imply:*** To hint or suggest without stating directly.

***Infer:*** Reach an opinion from facts or reasoning.

I ***implied*** one thing but my boss ***inferred*** something else and it caused huge embarrassment for both of us before the customer.

**29. *Inanity/Inanition***

***Inanity:*** Foolishness or senselessness.

***Inanition:*** Lacking vigor.

Sometimes politics includes too many tiresome ***inaneities***.

The vast dependence on portal entertainment is leading us into a world of ***inanition***.

**30. *Incredulous/Incredible***

***Incredulous:*** Unbelieving or skeptical.

***Incredible:*** Unbelievable or hard to believe.

They found him totally ***incredulous***, so they accepted everything he said with a pinch of salt.

When the results of the election were announced, people found them ***incredible***.

**31. *Ingenious/Ingenuous***

***Ingenious:*** Clever and inventive.

***Ingenuous:*** Open, frank, and sincere; naive, unsophisticated.

The scientist who was thought to be ***ingenious*** in his research proved to be a plagiarist.

Unlike his brother, Ram is not ***ingenuous***.

**32. *Insulate/Insolate***

***Insulate:*** Wrap, cover.

***Insolate:*** Expose to the sun's rays.

Authors produce eminent works in ***insulation***, away from all the chaos of daily life.

People who work in open fields ***insolate*** themselves more during summer than people who work indoors.

**33. *Lightening/Lightning***

***Lightening:*** Illuminating or brightening, lowering.

***Lightning:*** Is what is accompanied by thunder during storms.

The sudden ***lightning*** made the sailors to reconsider their impending journey.

The appointment of a new secretary has ***lightened*** his responsibilities.

**34. *Loath/Loathe***

***Loath:*** Disinclined or reluctant.

***Loathe:*** Feel hatred or disgust for.

I am ***loath*** to admit my part in the loss of the football game.

I am ***loathe*** to watching reptiles even on the television.

**35. *Morbid/Sordid***

***Morbid:*** Interest in sad or unpleasant feelings.

***Sordid:*** Very dirty, gross.

The public often displays a ***morbid*** curiosity about the ***sordid*** facts of life in the slums as described by socially conscious authors; such as, Charles Dickens.

36. *Noisome/Noisy*

**Noisy:** Making a lot of noise.

**Noisome:** Harmful or offensive or disgusting.

The mobile phone tower radiations, though negligible, might prove *noisome* in the long run.

The *noisy* children annoyed the old couple.

37. *Passable/Passible*

**Passable:** Capable of being passed.

**Passible:** Capable of feeling or suffering; impressionable.

The actors gave *passable* performances but the singers sounded *passible* as they seemed to be unrehearsed.

38. *Perspicacious/Perspicuous*

**Perspicacious:** Having or showing insight.

**Perspicuous:** Easily understood or lucid.

He always thought his mother was a *perspicacious* judge of character.

He was a *perspicuous* orator and attracted huge crowds.

39. *Perquisite/Prerequisite*

**Perquisite:** Additional payment or profit; benefit expected; a perk.

**Prerequisite:** Required or necessary as a prior condition.

Competence is a *prerequisite* to promotion to the next level of administration.

According to the agreement of the company, he'll be given a car as *perquisite* for the executive post.

40. *Prodigal/Prodigy*

**Prodigal:** Means extravagant, wasteful, lavish behavior.

**Prodigy:** Is a gifted individual.

Although the ruler of the ancient kingdom was a *prodigy*, his *prodigal* habits were a cause for concern.

41. *Sacred/Sacrosanct*

**Sacred:** Holy.

**Sacrosanct:** Too important to be neglected.

She considers it her *sacred* obligation to protect children who are vulnerable. It is also a *sacrosanct* teaching of many religions.

42. *Sacrilege/Sacrilegious*

**Sacrilege:** Irreverence towards something considered holy.

**Sacrilegious:** Treating a holy thing or place without respect.

As a boy, he seemed to enjoy acting in a *sacrilegious* manner; for example, shouting in sacred places. His mother would admonish him, reminding him that his shouting was a *sacrilege*.

43. *Sanguine/Sanguinary*

**Sanguine:** Hopeful.

**Sanguinary:** Bloody or murderous.

Her *sanguine* nature helped her through the difficult times.

He's an ardent pacifist but his father is a *sanguinary*.

**44. Stanch/Staunch**

**Stanch:** Restrain a flow.

**Staunch:** Firm in attitude, opinion, or loyalty.

The city police are devising new plans to **stanch** the increase in crime.

Her **staunch** attitude led to her political debacle.

**45. Stentorian/Stertorous**

**Stentorian:** A very loud or powerful voice.

**Stertorous:** Harsh snoring or gasping sound.

The politician not only spoke in a **stentorian** voice, but he was reportedly also **stertorous** when he was sleeping.

**46. Tortuous/Torturous**

**Tortuous:** Full of twists and turns.

**Torturous:** Causing or involving torture or suffering.

The movie was so **tortuous** that few understood what the director wanted to convey through his movie.

A **torturous** illness or anxiety is one that is extremely painful.

**47. Turbid/Turgid**

**Turbid:** Unclear, when referring to liquids, muddy, thick, unclear.

**Turgid:** Enlarged, swollen and, when referring to language, pompous, overblown grandiloquent.

The fog made it **turbid** for the planes to land.

The **turgid** speech of the Mayor was criticized by the media.

**48. Venal/Venial**

**Venal:** Open to bribery and corruptible.

**Venial:** Pardonable, trifling, not serious.

The **venal** bank manager was discharged from his duties.

His mistakes were dismissed as **venial**.

**49. Veracious/Voracious**

**Veracious:** Observant of the truth; habitually speaking the truth.

**Voracious:** To eat very large amounts of food.

Sally's expression did not match her voice; nobody believed her **veracious** statements.

The student's **voracious** appetite for knowledge surprised the librarian.

**50. Urban/Urbane**

**Urban:** Relating to cities and the people who live in them.

**Urbane:** Polite and confident.

Since he is brought up in an **urban** society, his mannerisms are **urbane**.

# CHAPTER 15

## Answer Key and Explanatory Notes

### ANSWER KEY

#### *Sentence Equivalence — (Chapter 5)*

Q. No	Ex - 1	Ex - 2	Ex - 3	Ex - 4	Ex - 5
1	C, E	B, D	D, F	B, D	B, E
2	C, F	B, D	B, E	A, D	C, D
3	B, C	D, F	C, E	C, E	C, D
4	A, B	C, E	D, F	D, E	C, E
5	A, C	E, F	B, D	D, F	D, F
6	B, F	A, D	D, E	B, F	A, C
7	D, E	E, F	B, F	D, F	D, E
8	E, F	A, C	B, D	C, E	B, D
9	B, C	C, E	C, E	B, D	A, D
10	D, E	B, F	B, D	C, D	B, E

#### *Text Completion — (Chapter 6)*

Q. No	Ex - 1	Ex - 2	Ex - 3	Ex - 4	Ex - 5
1	B, F, H	C, E, H	B, F, G	C, D, H	A, D, G
2	C, E, I	B, E, I	A	A, F, H	B, D, G
3	A	C, E, I	A, F, G	B	B
4	C, E, I	A, D, G	A, F, H	A, E, G	A, D

(Continued)



5	B, F, H	B, E, H	A, F, G	B, E, I	B, D
6	C, E, H	A	A, E, G	C, D, H	C, F, I
7	B, F, G	A, D, H	A, E, H	A, F, G	A, F
8	A, E, H	A, E, H	C, D, G	A, D, G	A
9	B, E, G	B, D, G	A, F, H	B, D, H	C, E, H
10	C, D, G	A, D, G	A, F, G	A, D, G	C, D, G

### Reading Comprehension — (Chapter 8)

Q. No	Ex - 1	Ex - 2	Ex - 3	Ex - 4	Ex - 5
1	C	B	B	D	C
2	A	A & B	E	B	D
3	*	*	B	A, B & C	C
4	D	C	B	A	B
5	B	E	C	C	B
6	C	E	D	A	D
7	D	C	C	A	E
8	C	C	B	D	D
9	B	A	C	C	C
10	E	B	C	A	A

Ex: 1 \* 'Defenders of Judicial activism \_\_\_\_\_ with changing times.'

Ex: 2 \* 'She had seen just about \_\_\_\_\_ designs to be free.'

## EXPLANATORY NOTES FOR EXERCISES

### Writing Mechanics for AWA — (Chapter 2)

#### Exercise: 1

1. Has.
2. Is.
3. Has.
4. Presents.
5. Hopes.

#### Exercise: 2

1. After Susan loaded the new program on the computer, the computer crashed.
2. The documents filed by the temporary assistants were out of order, so the files were all sent back to the main office.

3. The workers' union won praise among workers by lobbying for additional insurance.
4. Agnes is forwarding the two clients' airline tickets, one of which has been confirmed.
5. Bond falls off a mountain cliff in his new movie.

**Exercise: 3**

1. We must collect and tabulate the survey responses to know the population statistics.
2. The almost extinct species were found in the search and were rehabilitated.
3. For any further queries, call me on 121-987655-098.
4. I have attached the latest draft and highlighted the corrections.
5. The supervisor should approve the report, before the manager finalizes it.

**Exercise: 4**

1. A novice actor should learn how to memorize his lines and how to get into the character of the play.
2. Alicia's daily exercises include brisk walking, swimming and lifting light weights.
3. Mary Jones is looking forward to graduating from high school in June and attending college in the fall.
4. Antonio could not divide his time between his family and his work.
5. Plagiarism can lead to a failing grade for the semester or a failing grade for the course.

**Exercise: 5**

1. Having written carefully, I submitted the essay.
2. My grandfather taught me how to swim at the age of ten.
3. To achieve great heights, it is essential to get good grades.
4. While I was driving along the road, the peacock came into view.

**Exercise: 6**

Much.  
Among.  
Fewer.  
As much as.

**Sentence Equivalence — (Chapter 5)****Exercise - 1**

- Q.1. The expression 'from its .... savage best' indicates that a word which means 'many, different' will fit the blank. The colon indicates that the latter part of the sentence will explain or extend the idea inherent in the first part of the sentence. 'Myriad' means an indefinitely great number. Thus, the two words that could fill the blank appropriately are 'myriad' and 'innumerable'. Thus, the correct answer is choice C (myriad) and choice E (innumerable).
- Q.2. 'Children learn at varying rates' shows children are being compared. The first group is slow. 'While' shows the blank needs to be filled with a positive word. 'Celerity' means swiftness and contrasts with slowness. 'Expedition' means promptness or speed in doing something. Thus, the two words that could fill the blank appropriately are 'celerity' and 'expedition'. Thus, the correct answer is choice C (celerity) and choice F (expedition).

- Q.3. The expression 'first played' indicates that a word which means 'basic' or 'undeveloped' will fit the blank. Thus, 'embryonic' and 'rudimentary' fit the blank appropriately. Thus, the correct answer is choice B (embryonic) and choice C (rudimentary).
- Q.4. The expression 'however' indicates a contrast and it connects the second part of the sentence to the first part. Caroline's confidence was dented. However, her teachers persuaded her to take the test again. Hence, 'exhorted' and 'cajoled' fit the blank appropriately. Thus, the correct answer is choice B (exhorted) and choice A (cajoled).
- Q.5. The expression 'suitably cocooned' indicates that a word which means 'persist' or 'unyielding' will fit the blank. Hence, 'dog' and 'plague' are appropriate choices. Thus, the correct answer is choice A (dog) and choice C (plague).
- Q.6. The relative pronoun 'which' indicates that a word which describes how it feels to be dehydrated during summer workouts is apt to fill the blank. Thus, the correct answer is choice B (demanding) and choice F (enervating).
- Q.7. The expression 'flash-in-the-pan' means 'sudden but brief success'. Critics do not want to extend credit to such kind of performances. Hence, 'disinclined' and 'reluctant' fit the blank appropriately. Thus, the correct answer is choice D (disinclined) and choice E (reluctant).
- Q.8. The expression 'more than that' means beyond what has already been mentioned. Physiotherapy and medicines have had a kind effect on the patient's health but it is climate which has had a real effect. A word which describes climate could fit the blank. 'Salutary' and 'salubrious' which mean 'health-giving' are appropriate. Thus, the correct answer is choice E (salutary) and choice F (salubrious).
- Q.9. The key words in the sentence are 'high salaries and perquisites'. 'Consequently' in the sentence explains what the firm subsequently became among job seekers. The blank needs a positive adjective. It should indicate the popularity of the company. Thus most sought after (B) and most coveted (C) are appropriate options. Thus the correct answer choice is B (most sought after) and choice C (most coveted).
- Q.10. 'But' indicates that the blank needs a contrast word. The first part of the sentence conveys a positive tone. Hence, the blank could be filled using a negative word. 'Hauteur' means 'proud' and is an apt choice. 'Superciliousness' means 'having an air of contemptuous superiority'. Thus, the correct answer is choice D (hauteur) and choice E (superciliousness).

## Exercise - 2

- Q.1. The expression 'fresh concerns' indicates that the pronouncements made by the authorities further increased anxiety among the public. The word which means 'commence', 'begin', 'initiate' will fit the blank. Thus the two words that could fill the blank appropriately are 'sparked' and 'triggered'. Thus, the correct answer is choice B (sparked) and choice D (triggered).
- Q.2. A patriarchal society is one where the head of a family is a male. The expression 'astonished .... ardent optimists' indicates that the rise of women to seats of power in such a society was beyond expectations. The blank therefore, needs a suitable adjective to describe the phenomenal 'rise'. The words 'meteoric' and 'spectacular' are appropriate. Thus, the correct answer is choice B (meteoric) and choice D (spectacular).
- Q.3. The expression 'to break the shackles' indicates that the commoners were subjected to certain restraints. Hence, the circumstances were such that they were serving only to 'forbid', 'restrict' or 'prevent their betterment'. Thus, the correct answer is choice D (restrictive) and choice F (prohibitive).
- Q.4. The expression 'yet .... violence' indicates a contrast in her nature. The expression 'silver lining' continues the idea of contrast indicating the hopeful aspect in an otherwise hopeless situation. The words 'bleak' and 'blighted' bring out this contrast. Thus, the answer is choice C (bleak) and choice E (blighted).

- Q.5. The word ‘breathtaking’ suggests that it is an awesome sight and worth watching. Hence, the words ‘behold’ and ‘descry’ are appropriate to fill the blank. Thus, the answer is choice E (behold) and choice F (descry).
- Q.6. The word ‘originate’ and the expression ‘impossible ... their roots’ speak about the origin of words. ‘Archaism’ refers to the use of archaic features in a language or art. The context indicates that words originate from distant past but get influenced by alien cultures. Thus, the answer is choice A (archaism) and choice D (antiquity).
- Q.7. Mostly gestures mean the same. But when they differ, the inconsistency is very noticeable. ‘Pronounced’ and ‘conspicuous’ convey this idea. Thus, the answer is choice E (pronounced) and choice F (conspicuous).
- Q.8. ‘If’ in the sentence indicates that when a certain condition is considered, one may experience something pleasant. The ‘colon’ indicates the continuation of the idea. ‘With gold’, after the blank, indicates that the blank could be filled with words like ‘lined’, ‘decorated’. Thus, the answer is choice A (gilded) and choice C (bedecked).
- Q.9. The word ‘for’ before the blank indicates that the journalist either did something or failed to do something. ‘Berated’ and ‘scientist’s achievements’ explain that the journalist failed to do something. The journalist highlighted the scientist’s strife instead of his achievements for which he was criticized angrily. Thus, the answer is choice C (overlooking) and choice E (discounting).
- Q.10. ‘Outmoded’ means old-fashioned issues. The second part of the sentence explains the meaning of the word ‘outmoded’. Thus, the answer is choice B (lacks currency) and choice F (is not in vogue).

### Exercise - 3

- Q.1. The expression ‘crystal clear logic’ indicates that the blank could be filled with a positive word. Hence, ‘refreshing’ and ‘novel’ are appropriate words. Thus, the answer is choice D (refreshing) and choice F (novel).
- Q.2. The expression ‘has .... stultified’ shows that the composer’s style does not cause boredom as it is not jaded. The word that fits the blank, therefore should indicate what the composer’s style is. His style is a raw beauty. ‘Raw’ indicates freshness. Hence, the answer is choice B (naivete) and choice E (spontaneity).
- Q.3. The author comments that austerity may not always be a virtue. The word ‘as’ indicates the reason for this comment. The individual is too lazy to work to satisfy even his basic needs. He, however, hides his nature under the guise of ‘Austerity’. Hence, the words ‘camouflage’ and ‘mask’ fit the blank appropriately. Thus the answer is choice C (camouflage) and choice E (mask).
- Q.4. The words ‘fear’ and ‘wasteful pursuits’ indicate that the rich baroness’ son liked to spend money lavishly. Hence, the words ‘prodigal’ and ‘extravagant’ are suitable adjectives to describe the rich baroness’ son. Thus, the answer is choice D (prodigal) and choice F (extravagant).
- Q.5. The key words are ‘unwanted’ and ‘mainstream’. Youthfulness is idolized. So the ‘old’ fear that they may be neglected or ignored. Thus, the answer is choice B (sidelined) and choice D (marginalized).
- Q.6. An important problem today may seem absurd on a later day. The key word is ‘absurd’. It means completely unreasonable and illogical. Thus, the answer is choice D (farcical) and choice E (ludicrous).
- Q.7. The key expression is ‘chaos in our mind’. Attending a retreat helps. The word ‘consequently’ indicates the consequence of attending a retreat. It helps us to emerge out of the chaos in our mind. Hence, words which mean ‘conflict’, ‘disharmony’ and ‘dissension’ could fit the blank. Thus, the answer is choice B (discord) and choice F (strife).
- Q.8. The idea that sunspots cause periods of extreme cold on the Earth has become a contentious issue between the believers and non-believers of the idea. The idea is, therefore, being bombarded from both sides. Thus, the answer is choice B (fusillade) and choice D (crossfire).

- Q.9. In the given context, the word that could fill the blank should mean ‘bring back’, ‘recall’ etc. Hence, ‘evoke’ and ‘elicit’ are appropriate options. Thus, the answer is choice C (evoke) and choice E (elicit).
- Q.10. The second part of the sentence ‘even a . . . plight’ throws light on the mayor’s assurances. It indicates that his assurances are not genuine. Thus, the answer is choice B (sound insincere) and choice D (ring hollow).

#### **Exercise - 4**

- Q.1. The second part of the sentence indicates that Emily Bronte’s literary works were well appreciated by the later generations and in fact her work had a profound impact on them. The words ‘though’ and ‘yet’ indicate a contradiction. Her contemporaries did not think too high about her works. Thus, the answer is choice B (esteemed by) and choice D (revered by).
- Q.2. Mob behavior can destroy what has been achieved over the years. Hence, cult of violence does not aid progress or help in generating achievement. It brings about degeneration and regression. Thus, the answer is choice A (degenerating) and choice D (regressive).
- Q.3. The second part of the sentence suggests the strategy to be adopted for energy management. The key word is ‘coupled’. Thus, the answer is choice C (double-pronged) and choice E (two-fold).
- Q.4. The radio jockey’s comments on a man who was known for his impeccable behavior was unnecessary. The expression ‘a volley of protests’ indicates that the comments brought out annoyance. Hence, the option ‘provocative’ best fits the blank. Thus, the answer is choice D (provocative) and choice E (vexing).
- Q.5. The key word is ‘integrating’. This indicates that learning is a process of continuous interaction. Thus, the answer is choice D (correlation) and choice F (association).
- Q.6. The author states that modern-day enterprises are witnessing large-scale attrition and therefore the HR’s responsibilities have increased. The part of the sentence after the ‘colon’ indicates the duties HR has to perform. To do this efficiently, HR should be able to ‘foretell’, ‘predict’, ‘foresee’, the requirements for the smooth functioning of the organization. Thus, the answer is choice B (envisage) and choice F (visualize).
- Q.7. The expression ‘unlike . . . verbose’ indicates that the blank could be filled with a word opposite in meaning to ‘verbose’. Thus, the answer is choice D (brevity) and choice F (concision).
- Q.8. The author states that inept economic planning leads to recession. The expression ‘exerts . . . pressure’ indicates that the blank could be filled using a word with negative connotation. Thus, the answer is choice C (ripple) and choice E (domino).
- Q.9. The words ‘underdogs’, ‘elated’ and ‘one-off-victory’ are important clues. The word ‘But’ indicates a contrast. The expression, ‘Erstwhile champions’ contrasts with the word ‘underdogs’. They have the ability to bounce back. The ‘underdogs’ must understand and realize this. Thus, the answer is choice B (reckon with) and choice D (consider).
- Q.10. As a civilization, we have reached the lowest point. The clue word ‘yet the irony’ indicates we are not affected and remain satisfied with our achievements. Thus, the answer is choice C (complacency) and choice D (smugness).

#### **Exercise - 5**

- Q.1. The author comments that an individual faces the highs and the lows of life. The word ‘demotivating’ describes lows of life. The blank could be filled with a word that describes the highs of life in a positive connotation. Therefore, words like ‘energizing’ ‘motivating’ are appropriate. Thus, the answer is choice B (exhilarating) and choice E (invigorating).

- Q.2. The governor was acquitted. The key expression ‘vital ... trial’ indicates that the trial was not fair. And the jury is likely to be denounced, ‘criticized’ or ‘attacked’. Thus, the answer is choice C (pilloried by) and choice D (flayed by).
- Q.3. Bold attacks against non-conformists were a must rather than an exception in a society which was guided by fanaticism. ‘Rabidly’ indicates extremism. Therefore, the adjective it modifies should also indicate a similar tone. The answer is choice C ‘jingoistic’ which means extreme patriotism and choice D ‘chavinistic’ which also means extreme patriotism.
- Q.4. The key words ‘Fears’ ‘only one’ ‘without.... distinction’ in the second part of the sentence indicates that they had their fears about the youngster not attaining academic distinction. The expression ‘metamorphosed ..... erudite’ shows that their concerns about the rustic youngster were misplaced as he distanced their fears by proving them wrong. Thus, the answer is choice C (allaying) and choice E (assuaging).
- Q.5. The key words are ‘aging’, ‘ill health’, ‘inclement weather’. They indicate that in spite of all these drawbacks, the professor was punctual and in his own way enthralled the audience. His style was unique and not something common. Hence, the answer is choice D (inimitable) and choice F (nonpareil)
- Q.6. The key words are ‘new junior manager’ ‘uncalled for’ and ‘senior director’; they indicate that the junior manager was rude and behaved without respect towards his seniors. Thus, the answer is choice A (impertinence) and choice C (temerity).
- Q.7. The second part of the sentence explains the cause and the first part of the sentence the effect. Her friends had a dubious background and it affected her behavior. She lacked good manners. The answer is choice D (uncouth) and choice E (boorish).
- Q.8. The author states that there are many instances in history showing that kings in their weakest moments have heeded to information provided by unscrupulous elements. The expression ‘realizing their folly’ indicates that they regretted and realized their mistakes. Thus, the answer is choice B (remorseful) and choice D (contrite).
- Q.9. The sleepy coastal town was pushed onto the international arena. How did this happen? ‘substantial marine exports’ brought about this drastic change. Words like ‘drive’ ‘push’ which mean ‘activate’ could fill the blank. Hence, the answer is choice A (hurtled) and choice D (catapulted).
- Q.10. The key words are ‘nouveau riche’ curb ..... his enthusiasm’. The author states that the friends of the youngsters advised him against extravagant spending. ‘Lest’ indicates the effect of extravaganza. Words which mean ‘flashy’ ‘showy’ or ‘tinsel’ could fill the blank appropriately. Thus, the answer is choice B (pretension) and choice E (ostentation).

## **Text Completion — (Chapter 6)**

### **Exercise - 1**

- Q.1. The missing word in the first blank should provide description of ‘The hallmark of divinity’. The word ‘but’ in the second sentence suggests that the missing word in the blank should be a contrast of the words ‘prejudices’ and ‘self-interests’ in the second sentence. Thus, ‘disinterestedness’ best fits in blank 1. The context in the second sentence and the words ‘our judgments’ in the third sentence indicate that the ‘ordinary mortals’ fit blank 2. Further, the word ‘consequently’ in the third sentence suggests that the word that fits in blank 3 should reflect the idea that ‘our judgments are governed by our prejudices and self-interests and so are subjective’. Thus, ‘colored’ best fits the context. Thus, the answer is B, F, H.

- Q.2. The text provides a description of ‘two grounds’ – one is the ‘affluent family’ and the other is the ‘leper couple’. And ‘the road’ clearly separates the two grounds. Thus, ‘demarcation’ best fits in blank 1. The words ‘an affluent family is hosting a lavish luncheon for friends’ suggest that friendliness could be felt in the air and ‘bonhomie’ which reflects this idea best fits in blank 2. The words ‘happiness had perhaps never touched their lives’ in the last line of the text indicate that ‘melancholy’ best fits in blank 3 as it reflects the dejected state of the leper couple. Thus, the answer is C, E, I.
- Q.3. The missing word in the first blank should give the description of ‘the solution’. The words ‘as they believe that inherent goodness and divinity exists in mortals’ suggest that ‘arbitration (judgment) best fits in the blank. This is the only answer choice which reflects the overall tone of the sentence. Thus, the answer is A.
- Q.4. The missing word in the first blank reflects on how human beings of the pre-civilization era sharpened the hunting skills of their offspring. Thus ‘honing’ which collocates with skills is the best answer choice in the context. The missing word in the second blank provides description of what type of training, ‘helps the new recruits to understand the operations of machines’. And ‘formal’ is the apt answer choice. The last sentence of the text states that management institutes are adding on managerial skills to technical skills. Thus ‘supplement’ best fits in blank 3. Thus, the answer is C, E, I.
- Q.5. The word which fits in the first blank of the text defines the ‘approach’ stated in the first sentence of the text. Thus, ‘modular’ (divided into independent units) which best explains the ‘approach wherein a few subjects are taught in a single block’ best fits in blank 1. The phrases ‘continuity of discussion’, ‘reinforces learning’ in the second sentence of the text suggest that ‘axiomatic’ (something that is obvious and needs no proof) best fits in blank 2. Further, the last sentence of the text states the various steps, if followed in a sequence, can help in ‘optimal’ learning. Thus, the answer is B, F, H.
- Q.6. The first sentence of the text presents a comparison between ‘small budget films’ and ‘big budget films’. Thus the phrase, ‘sometimes better than’ fits in blank 1. The second sentence of the text states that the small budget movies lack the gloss which big budget films have but they compensated it in terms of the subject and its appropriation. The answer choice which best reflects this idea is ‘relevance’ and hence fits in blank 2. Further; the last sentence of the text states that teachers can use ‘small budget films’ as useful aids in classroom and this hints at ‘shoestring budgets’ (small or adequate budgets) to be the right answer choice to fit in blank 3. Thus, the answer is C, E, H.
- Q.7. The rationale behind the word which fits in blank 1 goes as follows: *X* and *Y* are two features of reporting and if a magazine dedicates itself to the cause of ‘objective reporting’, then, treading the fine line between *X* and *Y* is not so easy. Since, *X* is ‘passionate touting’ and *Y*, which is the phrase in blank 1, is ‘vitriolic criticism’. This suggests that editors wish to be viewed as being ‘unbiased’ or ‘dispassionate’. Therefore, the words ‘neither – nor’ in the last sentence of the text suggest that ‘advocate uncritical embrace’ and ‘become hypercritical’ fit in blanks 2 and 3 respectively. These two phrases reflect the overall tone of the text i.e., ‘objective reporting’. Thus, the answer is B, F, G.
- Q.8. The missing word in the first blank could explain the effect of ‘debilitating weakness’ on the patients suffering from chronic fatigue syndrome. The word ‘even’ which precedes blank 1 emphasizes the fact that patients suffering from this syndrome become too weak to perform simple regular jobs. Thus, ‘routine chores’ aptly fits in blank 1. The missing word in blank 2 should explain the problem in ‘prescribing a medical treatment’. The answer choice which best explains ‘the problem’ is ‘gauge the side-effects’. The words ‘could’ and ‘may’ used in the last line of the text suggest an indefinite possibility. Thus, it is understood that some physicians are making a guess about the factors that cause this syndrome. Therefore ‘hypothesize’ best fits in blank 3. Thus, the answer is A, E, H.



- Q.9. The overall tone expressed by the first sentence of the text suggests that Elton's performance in the previous semester was not very exciting. The word 'nothing' which precedes blank 1 suggests that 'write home about' fits in the blank as it completes the idiom 'nothing to write home about' (of little value or importance). The missing word in blank 2 should explain Elton's decision in order to get good grades in the current semester. The words 'write elaborate notes' and 'pay heed to the minor details' in the second sentence suggest that 'work assiduously' aptly fits in blank 2. From the last sentence of the text, it is clear that 'paying heed to minor details' is in sharp contrast to Elton's previous habit of the 'big-picture approach'. Thus, 'scant respect' which suggests his attitude towards minor details best fits in blank 3. Thus, the answer is B, E, G.
- Q.10. The word that fits in blank 1 should convey the state in which the youth is in. The words 'festivities' and 'foot-tapping music' in the second sentence of the text suggest that liveliness or cheerfulness is in the air. The word 'reticent' which characterizes the faculty team suggests that the antonym 'exuberance' fits in the blank. The words 'enough' to light up the spirits' in the sentence suggest that the administrative staff played some role in lighting up the spirits of the faculty team. Thus, 'constant egging by' (encouraging someone) fits in the blank. Even the 'sternest' of them were ready to let their hair down for once and enjoy themselves. Thus, the answer is C, D, G.

### Exercise - 2

- Q.1. The missing word in blank 1 explains the situations confronted by 'whistle blowers'. The second and third sentences of the text refer to the real-life situations which whistle blowers confront i.e., strained or severed relationships with the accused co-workers. Thus 'stark reality' best fits in blank 1. The words 'penalized by law enforcers' in the last sentence provides the clue that 'face severe reprisals' is apt in blank 2. The word 'if' in last line of the text suggests a condition i.e., facing 'severe reprisals' or 'being penalized' would happen in case of lack of evidence for the accusation. Thus, 'remain unsubstantiated' best fits in blank 3. Thus, the answer is C, E, H.
- Q.2. The words 'medical malpractice' in the first sentence of the text suggest that the text focuses on the steps involved in getting a claim in case of illegal or negligent professional behavior. The missing word in the first blank of the text provides description of the negligent behavior of the 'service-provider'. Thus 'not conform to' is apt in the context. The first blank provides the clue to the missing phrase in blank 2. Thus, not conforming to expected standards of care can be termed as 'breach of duty'. The tone in the last sentence of the text suggests that it must further be established by the plaintiff that such negligent behavior by the service provider is 'certainly' the cause of the injury. Thus, the expression 'indubitably' (unquestionably) fits blank 3 best. Thus, the answer is B, E, I.
- Q.3. The second sentence of the text provides the clue to the missing words in both blank 1 and blank 2. The second sentence puts forth the assumption that the employer has power over the actions of the subordinates. This suggests that 'held responsible' fits in blank 1 and 'vicarious liability' (because the employer is indirectly held responsible for the acts of the employees) best fits in blank 2. Finally, the overall tone of the text suggests that 'every transgression' is apt in blank 3. Thus, the answer is C, E, I.
- Q.4. The first sentence of the text provides the clue to the missing word in blank 1. The words 'under the purview' suggest that 'its fold' best fits in blank 1. The first sentence of the text lists the various issues to be brought under the fold of GATT and this suggests that the Uruguay round turned out to be the most comprehensive one. Thus 'most far-reaching' is apt in blank 2. From the last sentence of the text, it can be understood that a few member countries refused to sign the deal unless the reason behind giving an exceptional status to agriculture is made clear. Thus, 'glaring exception' best fits in blank 3. Thus, the answer is A, D, G.



- Q.5. The missing word in blank 1 should describe the situation confronted by marketers. The overall tone of the text suggests that ‘ensuring that people pay attention to their advertisements’ has become a matter of prime concern for companies. Thus ‘challenging task’ best fits in blank 1. The word ‘only’ in the second sentence suggests that ‘minuscule’ is apt in blank 2. Finally, the word ‘exceptionally’ in the third sentence suggests that ‘arresting’ (attractive) best fits in blank 3 and this is the only choice which reflects the overall tone expressed by the first part of the text i.e., ‘ensuring that people pay attention to their advertisements’. Thus, the answer is B, E, H.
- Q.6. From the given text it is understood that Fergie Jenkins was a famous baseball player of Canada who later on became the franchise of the civil rights movement. The words ‘felt honored’ and ‘postage stamp’ suggest that ‘commemorative’ best fits in the blank. Thus, the answer is A.
- Q.7. The missing word in the first blank should explain the ‘long-cherished dream’. The word consequently in the second sentence suggests that ‘increase in average life expectancy is man’s long-cherished dream. Thus ‘longevity’ best fits in blank 1. Further, it can be understood from the text that caring for the older citizens is certainly an expensive affair. And thus ‘finance’ best fits in 2. The words ‘reality of lower birth rates’ suggest that ‘demographic patterns’ is apt in blank 3. Thus, the answer is A, D, H.
- Q.8. The text states that ‘industrial societies have evolved highly formal systems of wills’ and these words suggest that the missing word in the first blank should refer to ‘informal systems’. Thus, ‘unstructured’ best fits blank 1. The words ‘no outside’ which precede blank 2 and the words ‘hordes of lawyers’ which follow the blank suggest that ‘intervention’ best fits in blank 2. Though ‘interference’ also means the same, it is a stronger word than intervention. But the context in the text does not require such a strong word. The words ‘what once was more of a routine family matter’ suggest that the missing word in blank 3 gives a description of the ‘authorities’ who have confounded the ‘whole issue’. Thus, ‘extra-familial’ (outside the family) best fits in blank 3. Thus, the answer is A, E, H.
- Q.9. The missing word in the first blank should describe the society i.e., the society that ‘embraced the tenets’ of market economy. The words ‘policies .....assign a monetary value to sacredness of life’ in the second sentence and the words ‘have not felt comfortable’ suggest that ‘crass commercialization’ best fits in blank 2. The missing word in blank 3 should explain the ‘repercussions’ of crass commercialization i.e., an ‘irreparable damage’ is done to filial and societal bindings. Thus, ‘breached irreparably’ best fits in blank 3. Thus, the answer is B, D, G.
- Q.10. The missing word in the first blank should give a description of what a lay person would associate off shore business with. Thus ‘prosperity’ is the right answer choice in blank 1. But from the context it is clear that off shore business is ‘not a joy ride’. The expression ‘is far better than being restricted from’ in the second sentence suggests that ‘at the very outset’ is apt in blank 2. The missing word in blank 3 should explain the ‘restriction’. And the expression ‘now the rewards cannot be sent home’ hint at ‘repatriating profits’ to be the right answer choice in blank 3. Thus, the answer is A, D, G.

### Exercise - 3

- Q.1. The text focuses on the aspects to be taken care of by a company for its ‘continued success’. The missing word in the first blank should provide description of the kind of introspection a company should indulge in for ‘a continued success’. Thus ‘a periodic’ is apt in blank 1 because only when introspection happens at regular intervals, ‘continued success’ is ensured. The words ‘highly competitive’ and ‘continuously changing external environment’ in the third sentence suggest that ‘dynamically’ best fits in blank 2. The last sentence of the text provides the clue to the missing word in blank 3. Thus, ‘successfully’ is apt as only this choice reflects the overall tone i.e., ‘ensuring continued successes’. Thus, the answer is B, F, G.

- Q.2. The words ‘on account of tremendous developments in technology’ suggest that ‘innovative is the right answer choice to fit in the blank. Thus, the answer is A.
- Q.3. The text is about ‘trepanation—a medical intervention practiced in the past. The words ‘signs of skull tissue re-growth’ in the second sentence of the text provide the clue that ‘not fatal’ is apt in blank 1. Further, the context in the text refers to injuries caused by primitive weapons. Therefore ‘inflicted’ best fits in the second blank and the words ‘fractured skull were removed’ provide the clue that ‘severed fragments’ best fits in blank 3. Thus, the answer is A, F, G.
- Q.4. The first two sentences of the text convey that the visitors to the art center were not being charged. The missing word in the first blank should explain how to ‘make the venture sustainable’. The words ‘however, this initial largesse’ and ‘only to induce trail’ in the third sentence suggest – that ‘monetize’ best fits in blank 1. The words ‘clarity has not emerged’ and ‘toying with various ideas’ in the last sentence suggest that the management is contemplating on how to bring in the change i.e., from visitors not being charged to visitors being charged. Thus ‘effect the transition’ is apt in blank 2. The missing word in blank should explain why management is toying with various ideas to ensure regular flow of visitors. Thus, ‘steady’ best reflects the idea. Thus, the answer is A, F, H.
- Q.5. The missing word in blank 1 should describe the condition of the players as professional sport seems to be becoming dirtier day by day. The words after the first blank provide the clue that the players appear to be fending gladiators. The second sentence of the text states that the excitement before events and the language used by journalists also justify the idea stated in the first sentence. Thus, ‘vindicate this observation’ is apt in blank 2. The part of the sentence after blank 3 suggests that ‘king of the arena’ best fits in blank 3. Thus, the answer is A, F, G.
- Q.6. The missing word in the first blank provides a description of Americans as described in Amanda Little’s work. The clues to the phrase in the blank are the words ‘passion to mass-produce’ in the 2nd sentence and ‘love for big, fast cars’ in the third sentence. These suggest the extravagant attitude of the Americans as described in Amanda little’s work. And sentence 3 of the text suggests that they are worried that oil is not a perennial source of energy. Thus, ‘genuine concerns’ best fits in blank 2. The last sentence of the text states that she manages to keep the reader engrossed and this suggests that though her work is reportage, it is not dull or boring. Therefore, the expression ‘but not of the prosaic kind’ fits in the third blank. Thus, the answer is A, E, G.
- Q.7. The use of ‘while’ in the first sentence suggests that the missing word in the first blank should be a contrast to the idea that ‘religion comes easy to American political leaders’. Therefore ‘not the forte of’ is the right answer choice in blank 1. The missing word in blank 2 should provide description for what ‘the disparity’ means ‘as it is likely to influence the outcome of elections’. Thus ‘cause for concern’ is the best choice. Thus, the answer is A, E, H.
- Q.8. The first sentence of the text states that food from cloned animals is safe. The word ‘yet’ in the second sentence suggests a contrast. Therefore, the expression ‘no takers’ fits in the first blank. The missing word in blank 1 provides the clue to the future of these products i.e., it seems ‘bleak’. The context indicates that the consumer is important. Hence, ‘King of the market’ is appropriate. Thus, the answer is C, D, G.
- Q.9. The text begins with a debatable issue i.e., the law of ‘presumed consent’. The missing word in blank 1 should provide a description of how the issue is being viewed. The words ‘doctors world over are raising serious questions’ also suggest that it has become a debatable issue. Thus, the word ‘contentious’ best fits in blank 1. The missing word in blank 2 should explain what ‘no objection’ cannot mean. The negative word ‘cannot’ suggests that the blank takes a positive word. Thus, ‘acceptance’ is apt. Further, the words ‘humanitarian issue’ and ‘not force’ in the last sentence suggest that ‘compassion’ best fits in blank 3. Thus, the answer is A, F, H.

- Q.10. The missing word in blank 1 should describe the ‘task’. The words ‘lack of specific policy guidelines’ and ‘hardships in implementing the existing ones’ suggest that the champions of carbon reduction markets are facing a ‘very big’ task. Thus ‘gargantuan’ best fits in blank 1. The words ‘creating confusion abound’ in sentence 2 suggest that ‘confounded’ best fits in blank 2. The words ‘the rest of the world has turned the other way round’ suggest that the big countries are in support of climate change science. Thus, ‘lend their shoulder’ best fits in blank 3. Thus, the answer is A, F, G.

### Exercise - 4

- Q.1. The first sentence of the text is a statement. The words the ‘US supreme court’ in the first sentence and ‘the ruling’ in the second sentence suggest that ‘benchmark ruling from’ best fits in blank 1. The second sentence offers a clue to the word that can fit into blank 2. The words ‘it would muffle a common man’s voice suggest that the U.S president disapproved of the ruling. Thus ‘deplored’ best fits in blank 2. The word ‘however’ suggests a contrast so, the missing word in blank 3 will be a positive word. Thus, ‘outstanding victory’ best fits in the third blank. Thus, the answer is C, D, H.
- Q.2. The first sentence of the text states that the chocolate tastes of the Americans and the British are distinct. And this suggests that the acquisition of British Cadbury by American Krafts food seems ‘incongruous’ i.e., unsuitable (since their tastes differ). Further the words ‘yet’ and ‘absolute harmony’ in the second sentence and ‘in spite of’ in sentence 3 suggest that they still ‘complement’ each other. Finally, the words ‘amalgamation’ and ‘sharp’ difference in the ethos suggest how the skeptics have described their union. Thus, ‘a marriage of convenience’ best fits in the blank 3. Thus, the answer is A, F, H.
- Q.3. The words the ‘most unusual’ which precede the blank and the reference to ‘time’ suggest that ‘phenomenon’ best fits in the blank. Thus, the answer is B.
- Q.4. The context in the text suggests that social scientists have often looked into the root cause of poverty and argued over the causes of poverty. Thus ‘deliberated on’ which means ‘to carefully consider’ is the best answer choice to fit into the first blank. The words ‘because of structural failures’ suggest that a negative word fits into blank 2. Thus, ‘incompetence’ is the apt choice and from the last sentence of the text it is clear that poverty researchers have not carefully examined certain facts of the economic game. Therefore, the answer choice ‘addressing’ fits into the third blank as it reflects the above stated idea. Thus, the answer is A, E, G.
- Q.5. The missing word in blank 1 should describe the relationship which Jung initially had with Freud. The words ‘later disagreed’ in sentence 1 suggest that initially Jung was an ‘ardent follower’ of Freud. The words ‘collective unconscious’ and ‘individual’s sub conscious’ in the third sentence of the text suggest that ‘emotional’ best fits in blank 2. The word ‘too’ in the last part of the text suggests that Jung has explained human behavior from various perspectives. Thus, ‘psychological and cultural’ best fits blank 3. Thus, the answer is B, E, I.
- Q.6. The words ‘worse is yet to come’ and ‘complete market crash’ in the final sentence and ‘the crises’ in the second sentence suggest that American economy is in a disorderly state. Thus, the word ‘tumultuous’ best fits in the first blank. The third sentence of the text which conveys the perspective of financial experts and the reference to ‘soaring oil prices’ in the 4th sentence hint at ‘precipitated’ (give rise to) being the right choice to fit blank 2. The last sentence of the text offers the clue ‘the oil prices skyrocket’. It contrasts the pace of economy. Hence ‘lethargic’ appropriate in third blank. Thus, the answer is C, D, H.
- Q.7. The words ‘problem child’ and ‘adding further’ suggest that ‘woes and woes begone’ is apt in blank 1. The missing word in the first blank provides the clue to the missing word in the second blank. Thus ‘compromise’ is apt in the context. The word ‘regrettably’ suggests that a negative word fits in the blank i.e., ‘compromises’ and failure to abide by one’s own principles leads to moral degradation. Thus, ‘declension’ (moral deterioration) is apt in the context. Thus, the answer is A, F, G.

- Q.8. The words ‘impending dangers and their consequences’ in the first sentence suggest that ‘compulsive offenders’ best fits in blank 1. The missing word in blank 2 gives a description of what is to be reduced by the treatment. And ‘recidivism’ (repetition of the crime) best fits in the blank. Further ‘aggravated’ best fits in blank 3 as it reflects the overall idea expressed by the part of the sentence following blank 3. Thus, the answer is A, D, G.
- Q.9. The missing word in blank 1 should provide a description for ‘a child with abundance of talent’. And ‘precocious’ best fits in the blank. The second sentence of the text states that such abundantly talented children can achieve more with less effort i.e., they are not hard working. The phrase ‘due application’ would be the right choice to fit in blank 2 as it completes the stated idea. The word ‘thus’ in the last sentence indicates that the missing word in blank 3 should reflect what would consequently happen. Apart from this, the words ‘a trait that is a prerequisite for higher order learning’ also suggest that ‘remains uncultivated’ best fits in blank 3, and this is the only answer choice that best reflects the overall tone expressed in the first part of the text i.e., ‘a precocious child is not necessarily a blessing’. Thus, the answer is B, D, H.
- Q.10. The missing word in blank 1 should explain the reason why Mangroves are endangered. The word ‘insensitive’ which precedes the blank suggests that ‘exploitation’ is apt in blank 1. The missing word in blank 2 gives a description of what is ‘likely to worsen’. The expression, ‘Mangrove habitat loss’, suggests that coastal ‘sustainability’ is the right answer choice. The words ‘severe weather conditions’ provide the clue to the word in blank 3. i.e., the missing word in blank 3 explains how severe weather conditions affected climate change. Thus, exacerbated is the right answer choice (as climate change has exacerbated severe weather conditions). Thus, the answer is A, D, G.

### Exercise - 5

- Q.1. The missing word in blank 1 gives a description of the ‘modern notion’ about ‘saturated fat’. From the second sentence of the text, it is clear that a recent study has ruled out the earlier findings that ‘saturates have adverse effect on the heart’. Thus, the word in the first blank should be antonymous to this idea. Therefore, ‘not nefarious’ (not bad) is apt in blank 1. From the overall tone expressed by the first two sentences of the text, ‘as a surprise’ best fits in blank 2. The phrase ‘in spite of’ which precedes blank 3 provides the clue that ‘assuring’ best fits in blank 3. Thus, the answer is A, D, G.
- Q.2. The first sentence of the text suggests that the earth and the sun are the forces which control the complex ocean currents. Thus, the missing word in blank 1 explains how important these forces are. Thus, the right word is ‘key’ forces. For water to move to higher altitudes, strong currents are needed. Thus ‘robust’ best fits in blank 2. The remote sensing technology is helping the scientists to study Gulfstream currents. Thus, ‘delineate’ which means ‘to describe’ is apt in blank 3. Thus, the answer is B, D, G.
- Q.3. From the context, it is understood that literary works in the sixteenth century England were not created in ‘isolation’ so it can be implied that the literary works of that period were influenced by social events. Thus, ‘undeniable’ best fits the blank. Thus, the answer is B.
- Q.4. The missing word in the first blank should convey what the message passed on by one aggressive country to its belligerent neighbors is. Thus, ‘unmistakable warning’ is apt in the context as it reflects the overall idea i.e., tension blowing up into a major crisis between the ‘belligerent neighbors’. Further, the word in blank 2 explains how one of the aggressive neighbors has blamed the other. Thus, ‘perpetrator’ best fits in the blank.
- Q.5. The words ‘which share more than 7000 genes with humans’ in the third line of the text suggest that the missing word in blank 1 is ‘similarity’; (referring to generic similarity between sea urchins and humans). The second sentence of the text states that a detailed study of the DNA of sea urchins helps finding a cure to diseases like Alzheimer’s and this is causing ‘great excitement’ among biologists. Thus, the answer is A, B, D.

- Q.6. The missing word in blank 1 should explain the phrase ‘controls a large’ which precedes the blank. And since the context in the first sentence refers to controlling a large part of the market, ‘proportion’ best fits in blank 1. The words ‘push the market price of a commodity down’ in sentence 2 suggest that ‘downturn’ best fits in blank 2. If the prices of a commodity are down, it results in economic failure. The words ‘in its own way’ in the last sentence suggest ‘unique’ is the right answer choice in blank 3. Thus, the answer is C, D, I.
- Q.7. The opening sentence of the text states that yearning business managers are competent in understanding the nuances of profit making. The word ‘but’ which precedes blank 1 suggests that a contrasting word/idea follows. Thus, ‘heedless’ best fits in blank 1, which means they are unmindful about ‘human rights’ and give a step motherly treatment to carbon foot prints. The phrase which fits in blank 2 is ‘a cause for concern’ because the negligent attitude of these yearning businessmen is a matter of worry or concern. Thus, the answer is A,F.
- Q.8. If genes suffer from amnesia, genes will forget the traits of a person and this means we need not worry about unwanted repercussions. In other words, it will increase our control over genes. Hence, ‘enhance’ is a suitable word for the blank. Thus, the answer is A.
- Q.9. The clue to the missing word in blank 1 is provided by the words ‘reinforced by doting parents’ in sentence 2 of the text. Thus ‘unwittingly encouraged’ is apt in blank 1. The word ‘however’ in the third sentence suggests that a contrasting idea follows. Thus, the missing word in blank 2 explains how children who start entering adulthood would react to the decisions taken by parents. The words ‘preaching’ and ‘hatred’ in sentence 3 suggest that a negative phrase fits in blank 2. Thus ‘tend to resent’ is apt. And the words ‘participate in learning with renewed enthusiasm’ in the last sentence of the text hint at, ‘overcome inhibition’ to be the right option to fit in blank 3. Thus, the answer is C, E, H.
- Q.10. The words ‘provoke passions’ in sentence 1 are negative. There is a shift against the media culture which provokes passions. ‘Dominant’ suits the tone of the sentence. ‘Internet’ helps in reducing the domination of print media. Hence ‘neutralizes’ is suitable for the second blank. Public has the best advantage to ‘reason’ out soundly. Thus the correct answer is C, D, G.

## ***Critical Reasoning — (Chapter 7)***

### ***Exercise - 1***

- Q1. Wetlands and forests serve as filters. So the logical conclusion is that preserving or planting trees along the streams and rivers will help to keep the waterways clean. Option B introduces new information, so is not a correct answer. Option C is irrelevant. Options D and E are out of scope, so are not correct. The correct answer is option A.
- Q2. The author concludes that the findings are troubling because a person who needs immediate care may not receive it. In drawing this conclusion, he assumes that patients with serious problems may be at a risk if they fail to get emergency help. Option B is the correct answer. Option A is stated. Option C is incorrect as it is too specific. Options D & E are irrelevant. The correct answer choice is option B.
- Q3. The presence or absence of fish in lakes affects only some flamingos. So we can infer that the others are not affected because of different food sources. Option A, B, C & D are not relevant.
- Q4. Option C is irrelevant. Options A, B and D strengthen the conclusion. Option E casts doubt on the role played by the pesticide in colony collapse disorder. The correct answer is option E.

- Q5. The paradox is best resolved by option E. The other options do not do anything to explain why the US hospitals are interested in building those facilities. Thus, the correct answer is choice E.
- Q6. Option B talks about enjoying shopping and not the place where they do their shopping. So rule out option B as it is irrelevant. Options C, D and E render support to the statement that shopping behavior varies by social class. Option A puts the onus of shopping behavior on childhood socialization patterns and educational influences and not on social class. Thus, option A is correct.
- Q7. Options A, B and D weaken the conclusion. Option E is irrelevant. Option C renders support to the conclusion. Thus, the correct answer is option C.
- Q8. The conclusion that the captain of the second boat is innocent is based on the assumption that he would have seen the signal if it was turned on by the captain of the first boat. Hence, the correct answer is option A.
- Q9. The claim that they have the best chemist is negated with the statement that all the chemists in the city of Samllville had the same training and were equally qualified. The preference, therefore, cannot be based on this claim and casts most doubt of the above reasoning. Thus, the correct answer is C.
- Q10. The conclusion that any solution to global economic crisis requires reducing current human supply is based on the assumption that earth cannot meet the unlimited demands created by human beings. Its resources are strictly confined. Options A and D are stated in the argument. Options B and C are irrelevant as they focus on measurement of earth's supply of raw materials. Thus, the correct answer is option E.

### **Exercise - 2**

- Q1. Except for option C, all the other options are irrelevant because they do not offer a logical conclusion to the passage. Strict isolation is not possible among human beings. Thus, the correct answer is option C.
- Q2. Option B is irrelevant because it distorts the information. Option C is too much of a generalization based on the information given. Options D and E only confirm what is already stated. The correct answer is option A.
- Q3. The flaw in the AU's thinking is pointed out in Option E. To control corruption, it is not enough if there is accountability and transparency only among public officials.
- Q4. The first boldface is not a conclusion, so we can rule out options A and E. Option C can also be ruled out as the first bold face is not an assumption. The first bold face is a finding. Between options B and D, we can omit option D because the finding does not contradict the conclusion. The correct answer choice is Option B.
- Q5. The conclusion states that a certain amount of anger is necessary for survival. Hence, the assumption is that without expressing anger it may be turned inward causing health concerns. The correct choice is Option D.
- Q6. Countries where women are marginalized suffer from poverty. Hence, the economic progress depends on emancipation of women. Thus, the correct answer choice is A.
- Q7. Gannets exhibit grace and clumsiness in equal amounts. So we can call them as birds of contrast. The correct answer choice is option A.
- Q8. Scientists claim that species of Amazon trees have survived massive temperature fluctuations is further supported by the information that neo-tropical tree species also endure temperature fluctuations. The correct answer choice is option E.
- Q9. Since the air bags have to be fitted into the mobile a logical conclusion that they are likely to be bulky can be drawn. The correct answer choice is option B.
- Q10. The employers are worried because their operational costs such as cheap labor will go up. Thus, the correct answer choice is option A.



## Reading Comprehension — (Chapter 8)

### Exercise - 1

- Q.1. From the first four lines of the passage, it is clear that detractors of judicial activism opine that it seizes the power of the government and damages the rule of law and democracy. Thus, only choice C is applicable.
- Q.2. In the context of the passage, ‘usurp’ means to take away forcibly. i.e., detractors (critics) of judicial activism accuse that judicial activism ‘forcibly takes away’ or ‘seizes’ the power of government branches or agencies. Thus, the answer is A.
- Q.3. Read the sentence, ‘Defenders of judicial activism \_\_\_\_\_ with changing times’ (sentence 3) of the passage.
- Q.4. The passage primarily discusses the possibility of a cure for cancer i.e., a new method of treatment. Lines (sentences 11-30) of the passage suggest that choice (D) reflects the author’s primary purpose.
- Q.5. The author is most likely to agree with choice (B). The expression ‘a strange tweak in the cells’ (sentence 4) justifies the option.
- Q.6. A review of the entire passage shows that the author is primarily concerned with discussing the pros and cons of the utility and potential of solar cells. Thus, the answer is C.
- Q.7. The author discusses the advantages and disadvantages of solar cells. Hence, the tone of the passage can best be described as balanced and analytical. Thus, the answer is D.
- Q.8. Refer to the last sentence of the passage ‘Extensive research on non-silicon based cells is the need of the hour as fossil fuels like petrol will be exhausted soon.’ Hence, the content of the passage can best be used to support the argument for further research for developing more efficient photovoltaic cells.’ Thus, the answer is C.
- Q.9. Read the entire sentence that contains this expression. ‘Despite the need to harness this energy, very little research has been conducted to make photovoltaic cells cost-effective and thereby available for utilization by the masses for their various devices.’ Thus, it is clear that the author uses the expression to mean ready to be consumed by the common man. Thus, the answer is B.
- Q.10. In the given context, ‘suspended’ means keep ‘something afloat’. Thus the answer is E.

### Exercise - 2

- Q.1. This question asks you about the information pertaining to Harriet Tubman which is NOT provided by the passage. Choices A, C, D and E are given in the passage.  
Lines (4–5) provide information about why she suffered from seizures and blackouts throughout her life.  
Lines (7–8) of the passage substantiate choice C. Line 5 of the passage corroborates choice D and the last line of the passage supports choice E.  
Only B is NOT given in the passage. The number of slaves who were caught while they were trying to escape is not given in the passage. Thus, the answer is B.
- Q.2. This question asks you to choose the options that are true about Harriet Tubman as suggested by the passage. Only choices (A) and (B) are correct.  
Lines 1 and 3 of the passage i.e., ‘despite being plagued by several problems’ and ‘she had seen just about every misery’, substantiate choice A.  
The very first line of the passage ‘The saga of Harriet Tubman epitomizes extraordinary courage’ substantiates choice B. Thus, the answer is A and B.

- Q.3. The sentence ‘she had seen just about every misery: expose her dangerous designs to be free’ explains the odds faced by Harriet Tubman.
- Q.4. The passage provides description of how the failure of the potato crop in the 19th century resulted in the Great Famine. It also provides information about the condition of the Irish peasants when the Famine broke. This question asks you about one of the most important effects of the Great Famine, as given in the passage. The Famine has changed Ireland from a one-crop economy to an agricultural economy. Thus, the farmers have started growing various crops and only choice (C) suggests this idea.
- Q.5. This question asks you to identify the main purpose of the passage. The main idea of the passage is to discuss one of causes of the Great Famine and its results. The passage describes why potato was the crop of choice of the Irish peasants and then explains the effects of depending on a single crop i.e., the Great Famine and how it changed Ireland’s economy. Thus, choice (E) is right. The passage does not focus on the reasons for the failure of the potato crop and this rules out choice (A). Though the passage describes why Irish peasants preferred potatoes to be their staple food, it is not the main theme of the passage. Choice (B) is ruled out because the words ‘significant changes’ leave the option very vague. Choice D is only a part of the discussion in the passage and hence is ruled out. Thus, the answer is E.
- Q.6. The passage answers all the questions from choices A through D. Only E is not answered. The passage does not explain why potatoes cannot be stored for a longer period. Thus, the answer is E.
- Q.7. Throughout the passage we find that the author is concerned about the way women in the armed forces are treated by their male counterparts, and the dissatisfaction experienced by the women in the forces. Thus, choice (C) best explains the author’s concern. Thus, the answer is C.
- Q.8. The passage presents the basic concepts of two schools i.e., the nature school and the nurture school. It also discussed the concepts in which both the schools believe or disagree. Thus, Nature Vs Nurture is the best title possible. Thus, the answer is C.
- Q.9. The passage says that the proponents of both nature school and the nurture school agree on all, the basic concepts of demonstration and comprehension of a language but they disagree on the concept of language acquisition. While the proponents of nature school believe that it is ability, the proponents of nurture school believe that it is nurtured and developed by environment (Read paragraph 3). Thus choice (A) is apt.
- Q.10. ‘Inherited’ suggests that the quality is inborn and not acquired or nurtured. Hence, option B is correct.

### **Exercise - 3**

- Q.1. The passage answers the questions. ‘How did Dr. Goddard develop the new field of rocket science’? Thus, the answer is B.
- Q.2. Last lines of the paragraph 2 provide the information. Thus, the answer is E.
- Q.3. Dr. Goddard successfully fired, for the first time in history, a liquid-fuel rocket into the air. Thus, the answer is B.
- Q.4. Option A is the correct answer. As per the context of the passage, ‘Hegemonic’ means ‘paramount.’
- Q.5. ‘Realism’ believes that international disputes cannot be resolved using moral parameters. Refer to the lines (A country should tend to its vital interests in security, influence over others, and economic growth—and not to moral ideals.). Thus, the answer is C.
- Q.6. Flexibility is not a characteristic feature of bureaucracy. Thus, the answer is D.
- Q.7. From the expression ‘the officials are appointed on permanent basis only’ it’s inferred that there is no part-time recruitment. Thus, the answer is C.



- Q.8. 'Classification and discussion' are the only methods that are not used by the author. Thus, the answer is B.  
Q.9. Refer to the sentence, 'The Kyoto protocol promised \_\_\_\_\_ nothing much' Thus, the answer is C.  
Q.10. The word 'unfathomable' from the passage conveys the meaning that the damage cannot be measured.

#### **Exercise - 4**

- Q.1. 'Sequel' means something that takes place after or as a result of an earlier event. Hence, Option D would be appropriate meaning of 'sequel' as used in the passage.  
Q.2. The lead role or main character in the film is Sigourney Weaver. Thus, the answer is B.  
Q.3. It is evident from the first sentence of paragraph 2 that effective isolation of nuclear waste will make it no longer hazardous. Hence, Option A is correct. Paragraph 5 indicates that options B and C are factors which determine how hazardous the nuclear waste is [Refer to paragraph 2 and 5]. Thus, the answer is A, B, C.  
Q.4. The passage does not indicate anywhere that if certain elements are controlled, nuclear waste is not likely to be harmful. Hence, option A is a false statement. All the other statements are mentioned in the passage and therefore, are true statements. Thus, the answer is A.  
Q.5. The purpose of the author is only to inform about the nuclear waste management. He is not warning or suggesting anything. Thus, the answer is C.  
Q.6. Christian Emperor Justinian's religious policy damaged the security of the center of the Agora. Refer to the last paragraph. Thus, the answer is E.  
Q.7. Only choice B is relevant in the given context. The answer is B.  
Q.8. The sentence 'One of the privileges of a freedman in the ancient republics of Greece, was the permission to take an active interest in public affairs' from the passage clearly indicates that only after being freed can a slave take interest in public affairs. Thus, the answer is A.  
Q.9. The statements 'Phrygians were good articulators' and 'Phrygians set the world standard for good repartee' are applicable, according to the given context. Thus, the answer is B and C.  
Q.10. The narrator accepts the greatness of Aesop. Refer to the sentence 'THE LIFE and History of Aesop is involved, like that of Homer, the most famous of Greek poets, in much obscurity.' Thus, the answer is B.

#### **Exercise - 5**

- Q.1. Only choice C applies. The passage suggests that learning happens when an individual's internal representations or ideas either align with or contradict with his /her experiences. Refer to lines 6 to 12 of the passage which corroborate choice C. Choice A is ruled out because the passage does not talk about learning from an external source. Choice B is incorrect because it contradicts with what has been said in the passage; i.e., when there is a mismatch between our ideas and experiences, we often fail but by accommodating the new experiences, we reframe our model of the way the world works. Thus, learning takes place. Thus, the answer is C.  
Q.2. Only choice D exemplifies Constructivist learning environment. According to the passage, constructivist learning advocates 'active learning' or learning by experience or by doing; i.e., the learner takes active participation. Only choice D reflects this aspect and hence is the right choice.  
Q.3. The passage mainly answers the question how learning happens? It explains the process of learning. The rest of the questions are not discussed in the passage. Thus, the answer is C.  
Q.4. The first three lines of the passage provide answer to this question. Thus, Choice B is apt.

- Q.5. The tone of the passage suggests that the author has presented the gist of a scientific study. Hence choice B is apt. Choice A is ruled out because the passage does not get into the details of any biological process. Choices C, D and E are ruled out because the words ‘evaluation’, ‘critical analysis’, and ‘review’ do not reflect the tone of the passage. Thus, the answer is B.
- Q.6. The passage provides information about the fact that the hippocampus plays an important role in learning and memory. Thus, only D is apt.
- Q.7. A fiscal conservative will be happy with all the statements except ‘E’ because completing projects involves expenditure and a fiscal conservative is against spending. Thus, the answer is E.
- Q.8. The mayor talks about developing innovative methods to balance the budget. Refer to the sentence ‘It means improving \_\_\_\_\_ with less’. Thus, the answer is D.
- Q.9. Starve the beast encourages deficit and expenditure. Refer to the lines ‘STB became a substitute \_\_\_\_\_ deficit larger’. Thus, the answer is C.
- Q.10. Only choice A is answered by the passage. The passage points at the fact that marine life is affected by human activity but does not explain how it happens. Thus choice B is ruled out. Similarly the passage does not discuss how marine life determines the nature of our planet. It is only stated. Choices E and D are not discussed in the passage. Thus, the answer is A.

## ***Explanatory Notes for Practice Test — (Chapter 9)***

### ***Practice Test -1***

#### ***Section - 1: Verbal Reasoning***

- Q.1. The author’s attitude can best be described as condescending. Thus, the answer is E.
- Q.2. Some writers had reservations about the interpretation of words used, not choice of words. Thus, the answer is E.
- Q.3. The conclusion drawn can be weakened, if there is something other than the practice of advertising which can enhance the business. Choice E shows that innovative ideas are important for a company’s growth. Thus, the answer is E.
- Q.4. This will support the idea that supply of clean water is of great importance. Thus, the answer is B.
- Q.5. The missing word in the blank should explain the condition which makes it ‘difficult to come up with a standardized formula. Thus, ‘ignore’ is a suitable word as the context refers to psychological prejudices of those who practice the investment arts. Thus, the answer is B.
- Q.6. ‘Result in an insular vision’ and ‘prevent one from exploring new avenues’ are phrases with a negative intonation and suggest that the missing word for blank (1) should explain what ‘previous experience’ might result in. Thus, ‘detrimental’ (dangerous) is the right answer choice. Thus, the answer is A
- Q.7. The missing word in blank (1) should convey that a strong debate regarding corporal punishment is still on. Thus ‘still brewing’ is apt in the given context. The context in the text suggests that those who are in favor of CP opine that complete ban of CP would result in parents losing control over their children. Thus ‘vitalize’ fits in blank (2). The last sentence refers to those who are against CP and according to them, it results in behavioral problems. Thus, ‘impairment’ is apt for blank (3). Thus, the answer is A, E, G.
- Q.8. The word ‘easily’ (after the blank) provides the clue that ‘get away’ best fits the blank. Thus, the answer is A.
- Q.9. The missing word in the first blank should describe the nature of the document. The clue to this word is provided by the words ‘fails to view the problem differently.’ For the second blank, ‘nebulous’ is appropriate. What they want to do offers clue for the third blank. Hence, ‘on their own accord’ is suitable. Thus, the answer is A, F, H.

- Q.10. An overview of the passage suggests that the author is primarily concerned with discussing the factors which have helped crocodiles to adapt themselves to the changing physical surroundings and survive for an incredibly long tenure on the Earth. Paragraph 2 discusses how the external and internal factors have been the cause for their resilience and paragraph 3 explains how these creatures have been able to survive by adapting themselves even to the worst situations. Thus, the answer is B.
- Q.11. The passage provides answers to questions A, B, C and E. The first two lines of the last paragraph provide answers for questions A and B. The last paragraph provides answer question C and E is answered in paragraph 2 (lines 4-8 of), but the passage does not provide answer to questions D. The passage just states that the crocodilians adopt a 'sit and wait' lifestyle but the reason for that is not discussed in the passage. Thus, the answer is D.
- Q.12. The phrases 'sit and wait', 'ambush predators', and 'stealth predators' used in the passage suggest that choice A is the right answer. Thus, the answer is A.
- Q.13. Selorita was reprimanded for being garrulous. 'Garrulous' means 'excessively talkative'. The expression 'Puzzling' shows that Selorita was wrongly reprimanded, because she was not actually talkative. The blank could be filled with a word which is opposite in meaning to the word 'garrulous'. Hence, reticent which means 'remain silent' is apt. Thus, the correct answer is choice C (reticent) and choice E 'precise'. Thus, the answer is C, E.
- Q.14. The 'colon' indicates that the latter part of the sentence will indicate what morality is governed by. 'Conviction' is a positive word. Since the context conveys that morality is no longer governed by 'conviction', the blank could be filled by a word which contrasts 'conviction'. Thus, the correct answer is choice D (convenience) and choice F (handiness). Thus, the answer is D, F.
- Q.15. The key words are 'imperceptible' and 'even battle-hardened physicians'. The symptoms of Parkinson's disease are so slight that even an expert physician finds it difficult to sense its onset. Thus, the correct answer is choice A (onset) and choice F (inception). Thus, the answer is A, F.
- Q.16. 'Cronies' and 'resentment' indicate that Lucy caused bitterness among her friends as she progressed in life. The expression 'neutralize' indicates that she could have done something to win over her friends. Hence, 'propitiatory' which means 'appease' and 'expiatory' which means 'atone' are appropriate choices. Thus, the correct answer is choice B (propitiatory) and choice D (expiatory). Thus, the answer is B, D.
- Q.17. The word 'relegated' indicates that the blank could be filled with a positive word. Hence, 'reigned supreme' and 'was idolized' are apt expressions. Thus, the correct answer is choice C (reigned supreme) and choice E (was idolized). Thus, the answer is C, E.
- Q.18. The passage addresses all the issues mentioned from choices A through D. Lines (3 and 4) of the passage provide answer to choice A. And the last sentence of the passage addresses choice B. Lines 9-10 of the passage address choice C. And the penultimate sentence of the passage answers choice D. But choice E is not addressed by the passage. The passage does not discuss how the GOE has wiped away the noxious gases from the earth's surface. Thus, the answer is E.
- Q.19. An overview of the passage suggests that the author is trying to explain how the Great Oxygenation Event has led to a change in the earth's atmosphere which in turn has led to the evolution of higher forms of life on Earth. Thus, only choice B is applicable. Choice A is ruled out because the passage does not talk about any biological phenomenon. Choice C refers to a biological innovation about which the passage does not give any clarity. And hence it is ruled out. Thus, the answer is B.
- Q.20. Choices A and C are directly stated in the passage (read lines 7 to 10). And E is corroborated by last two lines of paragraph 1. Only choice B can be inferred from the passage. From the passage, it is clear that microbial life thrived even before the GOE occurred i.e., when the oxygen levels were much lower. Thus, it suggests that these early creatures would have evolved in an environment with very less oxygen than today. Thus, the answer is B.

**Section - 2: Verbal Reasoning**

- Q.1. The policy framers had taken some issue 'to a new high'. We understand that the issue is about freedom of Press and Media. 'Comprehensive guidelines' indicate stringent control. Hence, the words 'bowdlerization' and 'censorship' convey the idea appropriately. Thus, the answer is choice B (bowdlerization) and choice F (censorship). Thus, the answer is B, F.
- Q.2. 'Legendary stars' become arrogant once they are renowned. The expression 'seldom .... their' indicates the blank could be filled with a word which contrasts 'arrogant'. Thus, the answer is choice D (humility) and choice E (bashfulness). Thus, the answer is D, E.
- Q.3. 'Though' suggests a contradiction. 'Evokes nostalgia' indicates that there are pleasant things one wants to recall about the palace. Hence, 'reminisce about' and 'muse over' indicate the positive tone. Thus, the answer is choice B (reminisce about) and choice F (muse over). Thus, the answer is B, F.
- Q.4. The second part of the sentence 'where in .... or ill treated' indicates abnormal behavior on the part of the individual. The 'condition' can be therefore described as 'strange', 'atypical', 'peculiar' etc. This is conveyed by the words 'aberrant' and 'deviant'. Thus, the answer is choice D (aberrant) and choice E (deviant). Thus, the answer is D, E.
- Q.5. 'Unfortunately' points to the flip side of enjoying good things in life. The expression 'tributes .... Intimacy' indicates that people may flock around a person for wrong reasons. Hence, the tributes offered may not be genuine. Thus, the answer is choice A (sycophantic) and choice E (unctuous). Thus, the answer is A, E.
- Q.6. The purpose of the question is to show which sentence indicates the presence of the strange underground in Paris. The sentence 'below the main town of paris \_\_\_\_\_ is unique features' indicates that paris has a unique underground.
- Q.7. The sentence 'Pop culture \_\_\_\_\_ symbol of freedom' in paragraph 3 points to the answer option 'unorthodox' in their thinking. Thus, the answer is D.
- Q.8. The author talks about Paris's underground and its multiple faces. Thus, the answer is E.
- Q.9. To know the Paris's underground, we need the help of cataphiles. Thus, the answer is E.
- Q.10. The phrase 'general purpose technology' and the word 'all' which precede the blank suggest that 'facets of life' is apt for blank (1). Sentence 2 states that this technology assures 'efficiency of the highest order'. Thus, the phrase 'the icing on the cake' fits for blank (2). The word 'but' in the last sentence suggests a contrast i.e., there is the other side to the coin. Thus, 'flip side' is the right answer choice to fit in blank (3). Thus, the answer is C, D, I.
- Q.11. The word 'succeeded' offers a clue. 'Amazing' therefore is appropriate for the first blank. For the second blank, 'practical' is appropriate. The words 'beginning' and 'new' offer a clue. They indicate that 'revolution' is appropriate for the third blank. Thus, the answer is A, D, G.
- Q.12. The phrases 'abject poverty', 'rights are denied' and 'opportunities curtailed' suggest that the missing phrase in the blank reflects the negative intonation expressed by these phrases. Thus, 'voices silenced' is the apt answer choice. Thus, the answer is A.
- Q.13. The words 'but still' after the first blank provide the clue that the missing word in blank (1) refers to negative aspects of literary criticism. Thus 'inadequacies' best fits the context. The missing word in blank (2) explains what literary criticism provides the writers with. Thus 'tools' best fits in blank (2). The word 'but' which follows blank (3) suggests that the missing word in the blank should be antonymous to the words 'co-existing concepts of truth and meaning'. Thus, 'different perspectives' is apt for blank (3). Thus, the answer is C, D, I.

- Q.14. The missing word in blank (1) should describe what damage the Bhopal Gas Tragedy and the Chernobyl accident caused in the world. The words ‘such tragedies could cause’ in the second line provide the clue that ‘magnitude’ best fits for blank (1). The missing word in blank (2) should explain the fact that nuclear accidents cannot be prevented. Thus ‘safety standards’ best fits in blank (2). The missing word in blank (2) provides the clues to the answer choice in blank (3). Since the second sentence of the text suggests that even the best safety standards cannot prevent nuclear accidents, there should be some way of compensating for damage and losses. Thus, there is a need to have ‘a legal regime’ \_ the right answer choice to fit the blank (3). Thus, the answer is C, D, I.
- Q.15. The author of the passage is very critical in refuting the point of view of certain philosophers. From the words ‘science is being killed’, we understand that the author seriously disapproves of their argument. Further, in the last sentence of the passage, the author quotes ‘Etienne Gilson’ which suggests that he very much agrees with Gilson in using the word ‘undertakers’ sarcastically to refer to the scientists. Thus, the answer is A.
- Q.16. In the first paragraph of the passage, we find that the authors of ‘The Grand Design’ have argued that the universe is created from nothingness and not because of a supernatural being, namely God, which has been our age-old belief. Thus, the argument jeopardizes our beliefs which have been held in high esteem by us. Thus, choice A reflects this. Further, the last 3 lines of the same paragraph present certain views of the authors, which alter our understanding of concepts about the universe. Thus, the answer is A and C.
- Q.17. The word ‘undertakers’ is used to refer to all those who have killed science i.e., based on the context in the passage, the reference is to the scientists. Thus, the answer is B.
- Q.18. Except statement A, all the other statements can be traced back to the passage. Thus, the answer is A.
- Q.19. In the given context, obsessed means ‘fixated on’. Thus, the answer is B.
- Q.20. In the passage, the expression ‘ruse’ means ‘deception’. Thus, the answer is A.

## **Practice Test -2**

### **Section - 1: Verbal Reasoning**

- Q.1. Option A is mentioned in the passage. Refer to the sentence, ‘But both egoist \_\_\_\_ philosophical abstractions’. We can conclude from the statement, ‘Many people have \_\_\_\_ in our recognition of him’ that option B is also mentioned in the passage. Option D is a true statement. Refer to the sentence, ‘Egotism like an eggshell \_\_\_\_ the art of life is that escape’. The statement, ‘The human being by nature \_\_\_\_ egotist nor altruist’ clearly indicates that option E is a true statement. According to the passage both the egotist and the altruist do not face any tragedy. Hence option C is not true according to the passage. Thus the choice is C.
- Q.2. According to the passage many wish to recognize self through religion. This begins with a tremendous clamor to some savior god or other to recognize them and ends in their recognition of him. Hence, the path of recognizing the supreme force does not lead to introspection. Option A can be ruled out. The statement, ‘The human being by nature and necessity is neither egoist nor altruist’ clearly makes option C incorrect. Options D and E distort the content. The statement ‘The fundamental art of life is to recover the sense of that great self-forgetful continuous life from which we have individually budded of’ indicates what the author believes. Thus option B is the right choice.
- Q.3. When bees face the problem of pathogenic fungi wild bees line their hives with more propolis because it significantly reduces the rate of infection. Option B is the right choice. Option A is irrelevant because the information provided does not suggest any comparison between synthetic antibiotic and propolis. Option C is out of scope. We are not concerned about the researcher’s opinion. Options D and E are irrelevant. Thus the correct choice is B.

- Q.4. Option A is incorrect because it contradicts the given information. Since, there are no surprises and lessons mentioned in the information we cannot draw any conclusions on these lines. Hence, option B can be ruled out. Option C is already stated in the passage so can be ruled out. Option E is out of scope. We can conclude that social practices like democracy are observed even in animal societies. Hence, option D is the right choice.
- Q.5. The phrases ‘exaggerated imagery’ and ‘extreme publicity’ denote a negative tone. Hence, options A and E can be ruled out. Marketing majors are ready to do anything to sell their goods. In the process they frame ‘deceptive’ slogans. In this context ‘dangerous’ and ‘cantankerous’ can be ruled out. Thus the correct choice is C.
- Q.6. The phrase ‘clearly marked off’ indicates that ‘realms’ which means ‘scope of something’ is appropriate for the first blank. ‘Controversies’ and ‘transgressions’ cannot be marked off clearly. ‘Nevertheless’ is a contrast indicator. The words after the second blank ‘relationships’ and ‘dependencies’ make options E and F irrelevant. Thus the correct choices are A and D.
- Q.7. The mention of ‘Breed ‘ in the second sentence indicates that ‘tamed ‘ is appropriate for the first blank. Scientists conducted DNA analysis of ancient turkey. This information confirms ‘discovered ‘ as the right choice for the second blank. ‘Despite’ is a contrast indicator and shows that ‘prevalent’ and ‘ubiquitous’ are irrelevant. The correct choices are B, D and G.
- Q.8. ‘Yet’ and ‘no longer’ indicate that options A and F are appropriate. Thus, the correct options are A and F.
- Q.9. The content of the sentence intends to show the paradox in the occurrence of cancer between smokers and non-smokers the word ‘compulsive’ is appropriate for the first blank. The second sentence attempts to resolve the paradox. Hence, ‘susceptibility to’ is appropriate for the second blank. Thus, the correct choices are A and E.
- Q.10. The appropriate sentence is, ‘of course’ such a figure, once connected with the ancient dignity of the patricians, could easily be converted into burlesque.
- Q.11. The last paragraph of the passage clearly indicates that changes in a society influence the art and culture of a particular place. Hence, option E is appropriate.
- Q.12. There is enough evidence that the rich patronized art and with the dwindling of aristocracy there was an adverse effect on art and culture. Thus option A is appropriate.
- Q.13. There are risks associated with nuclear disasters, yet many countries do not care. Thus, the answers are B and C.
- Q.14. The key idea is political condition that has led to certain new circumstances. Thus, the answers are B and C.
- Q.15. The key idea is ‘repercussions of the impending war’. Everyone seems to agree on this effect. Thus, the answers are A and D.
- Q.16. The key idea is transgression of rule of law law. Hence, the correct verbs are ‘supplant’ or ‘supersede’. Thus, the answers are D and F.
- Q.17. The words after the blank indicate that the word in the blank must have a negative tone. Thus, the answers are D and E.
- Q.18. The underlined phrase ‘begging the question’ means that it is illogical to claim that free press is contraindicative of socialism. The author quotes Lenin to support this ‘The free press of the socialist imagination is more liberating than liberalist in which all opinions of all citizens must be freely published’. Thus the correct choice is option C.
- Q.19. The last sentence of the passage shows that socialists are criticized for not encouraging freedom of press. Options A and B are not applicable in the given context. Thus option C is correct.



- Q.20. It was a command performance which lulled the political leadership into self-appraisal even if the intended readership did not necessarily buy into it, best describes the attitude of the public to bowdlerized information.

### **Section - 2: Verbal Reasoning**

- Q.1. The key word is 'tampered'. It shows that human beings are a source of disturbance. Thus, the answers are A and D.
- Q.2. The content of the sentence indicates that the author was not a local but understood the local issues. Hence, sensitive and touchy are appropriate. Thus, the answers are A and C.
- Q.3. Physicians have high social esteem and are expected to behave in a way that is professional. Thus, the answers are D and F.
- Q.4. The clue lies in the word nervousness. Hence, 'gripped' and 'seized' are appropriate. Thus, the answers are A and C.
- Q.5. The sentence indicates that the youngsters of today have a strong liking to photography. The words 'obsession' and 'fixation' are suitable. Thus, the answers are A and B.
- Q.6. The primary purpose of the passage is to convey that all have an equal share of common sense but they conduct themselves differently. Refer to the statement 'The conviction is rather to be held as testifying \_\_\_ we conduct our thoughts along different ways, \_\_\_ fix our attention on the same objects'. Thus the correct choice is C.
- Q.7. The greatest minds, as they are capable of the highest excellences, are open likewise to the greatest aberrations.
- Q.8. According to the passage good sense prevails in those who avoid erroneous decisions. Thus, the answer is C.
- Q.9. The negative words 'feel so isolated and lonely' show that 'a negative' is appropriate in the first blank. Since freedom becomes a negative condition people will seek to 'escape' and not 'enter' or 'impose'. Thus the correct options are B and D.
- Q.10. Advertisers have developed a liking to promoting a product aggressively. 'Touting' is an appropriate word for filling the first blank. Since 'touting' denotes an aggressive tone we can eliminate 'insipid' and 'gullible'. Thus the correct options are B and D.
- Q.11. The word 'deliberately' before the blank and 'experimental results' after the blank indicate that the results were 'fabricated' by the scientists to further their own careers. The scientist's reputation is no longer pristine but is 'compromised'. Thus, the correct options are C and D.
- Q.12. The structural clue 'though' indicates that 'excessive' can be ruled out for the first blank. The first part of the sentence is about the resources so 'unavoidable' can also be ruled out. For the second blank any option which suggests a problem is appropriate. Thus the correct options are A and D.
- Q.13. Freight railroads have been charging excessively to transport coal when the nation has shifted its preference to coal from oil. This act of the railroads impedes the implementation of the policy so the railroad is accused of playing foul. The correct options are C and D.
- Q.14. The last sentence of the first paragraph 'Her conviction in what she wrote \_\_\_ the book reached readers around the globe' indicates that option D is the correct choice. The other options are not relevant. The correct choice is D.
- Q.15. Because she was both a scientist and a writer she could write convincingly about the problem. Her dual role was an advantage to prove her point. Thus the correct choice is D.

- Q.16. In her book the author purports to warn the humans of the impending danger. Refer to the statement \_\_\_ she wrote that all life forms were connected and the act of injecting poisons into life cycles would soon affect human life \_\_\_. Thus the correct choice is B.
- Q.17. The logical conclusion to the passage is that a man in the mask adorns many roles. Thus, the answers is D.
- Q.18. Options A, B and E can be ruled out as they are already stated. Option D is not relevant. Since the power and gas companies have lost the confidence of the customers the author assumes that the customers will protest if there is a price increase. Therefore, the author concludes that customers must be taken on board. Thus the correct choice is C.
- Q.19. It has a culture that values the streets as points of social contact, exchange and intermingling - as testified by the large numbers of people who stroll along them without any apparent purpose than to enjoy it.
- Q.20. From the last paragraph we can infer that the government failed to address the problem of the Spaniards.



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## **PART II**

# **QUANTITATIVE REASONING GUIDE**

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# CHAPTER 16

## Introduction to Quantitative Reasoning

### ***Introduction to Quantitative Reasoning***

The Quantitative reasoning section on the *GRE*<sup>®</sup> *revised General Test* measures your ability to:

- Understand basic concepts of arithmetic, algebra, geometry, data analysis, and miscellaneous concepts like functions, symbols, etc.
- Reason Quantitatively and approach Logically.
- Solve problems in a quantitative environment.

The questions that appear in the quantitative reasoning section on the *GRE*<sup>®</sup> *revised General Test* cover four broad areas of Mathematics:

- Arithmetic.
- Algebra.
- Geometry.
- Data Analysis.

Questions on data analysis may appear in sets of two to five questions that share common data in the form of tables or graphs. The questions are based on this data. All the other questions appear as discrete questions.

The detailed syllabus in each of these broad areas is indicated below.

### ***Arithmetic***

- Arithmetic operations (addition, subtraction, multiplication, division, and powers) on real numbers.
- Properties of integers (For example: divisibility, factoring, prime numbers, and odd and even integers).
- Operations on radical expressions.
- The number line.



#### **Tips**

Before you schedule your actual GRE test, make sure you complete your personalized course of study with this book and take all the practice tests provided.

- Estimation.
- Absolute value.
- Percent.
- Ratios and Proportions.
- Exponents, decimals, and fractions.

### ***Algebra (Including Coordinate Geometry)***

- Rules of exponents.
- Factoring and simplifying algebraic expressions.
- Concepts of relations and functions.
- Equations and inequalities.
- Coordinate Geometry (including slope, intercepts, and graphs of equations and inequalities).

#### **The skills required are:**

- The ability to solve linear and quadratic equations, inequalities and simultaneous equations.
- The ability to understand and solve word problems by translating them into mathematical equations or inequalities.
- The ability to solve problems by applying basic algebraic skills.

### ***Geometry***

- Angle measure.
- Properties associated with parallel lines.
- Triangles (isosceles, equilateral,  $45^\circ - 45^\circ - 90^\circ$  and  $30^\circ - 60^\circ - 90^\circ$  right triangles).
- The Pythagorean theorem.
- Quadrilaterals.
- Polygons.
- Circles & Sectors.
- Areas.
- Perimeter.
- Volume.

The ability to prove theorems is not tested.

### ***Data Analysis***

- Basic descriptive statistics (such as mean, median, mode, range, standard deviation and percentiles, quartile deviation, and variance).
- Interpretation of data given in graphs and tables (such as bar and circle graphs and frequency distributions).
- Elementary probability, counting methods, permutations, combinations, and venn diagrams.

These questions assess the ability to synthesize information, to select appropriate data for answering a question, and to determine whether or not the data provided is sufficient to answer the given question. The emphasis in these questions is on the understanding of basic principles (for example, basic properties of normal distribution) and reasoning within the context of the given information.



#### **Tips**

On the computer based test, letters will not be used to designate choices. Each choice will appear on the screen with an oval next to it. In this book the answer choices are marked A, B, C, D, and E. This will help you in comparing your answers with the answer key provided.

## Test Components

The quantitative reasoning section has four types of questions:

1. Quantitative comparison questions.
  2. Multiple choice questions—Select one option.
  3. Multiple choice questions—Select one or more options.
  4. Numeric entry questions.
- **Quantitative Comparison Questions**—These questions test your ability to reason quickly and accurately find a possible relationship between two given expressions or data.
  - **Multiple Choice Questions (Select One Option)**—These are multiple choice questions that ask you to select only one answer choice from a list of five choices.
  - **Multiple Choice Questions (Select One or More Options)**—These are multiple choice questions that ask you to select one or more answer choices from a list of choices.
  - **Numeric Entry Questions**—Questions of this type either ask you to enter your answer as an integer, or as a decimal, or as a fraction. In the standard computer-based version of the test, use the computer's mouse and keyboard to enter your answer.



### Tips

Arrive at the test center 30 minutes before your test appointment. If you arrive late, you will not be allowed to take the test and you may have to forfeit your test fee.



### Tips

You will be provided with scratch paper. Do not bring your own. Do not carry the scratch paper out of the testing room.

## Quantitative Comparison

### What the Questions Look Like

In quantitative comparison questions, you will notice two columns marked as column A and column B. You have to decide whether:

- (a) The value of the expression in column A is greater than the value of the expression in column B
- (b) The value of the expression in column B is greater than the value of the expression in column A
- (c) Both the values are equal, or
- (d) The value of the expression in column A has no meaningful relationship with the value of the expression in column B.

Therefore, quantitative comparison questions have FOUR options.



### Tips

It's not wrong to make a mistake; it's wrong if you do not learn from the mistake.

### Sample Question

**Column A**

25% of 8% of 800

**Column B**

50% of 0.4% of 8000

### ***The Strategy to Answer Quantitative Comparison Questions***

1. Look at the quantities given in the two columns and check whether a valid comparison can be made. Here it is clear that the two quantities can be compared as they are standard arithmetic expressions. Hence, option (d) can be eliminated.
2. Wherever possible, avoid unnecessary calculations. In other words, do only as much calculation as is absolutely necessary.
3. Try to simplify the given expressions to make it easier to compare. For example, in this question, the percent sign appears twice in both the expressions. This means that the denominator is the same for the two expressions that need to be compared. It is now a matter of comparing the values that will appear in the numerator in both the expressions.

#### **Column A**

$$25 \times 8 \times 800$$

#### **Column B**

$$50 \times 0.4 \times 8000$$

Visual inspection reveals that  $25 \times 8 \times 800$  can be rewritten as  $25 \times 2 \times 4 \times 800$  or,  $50 \times 4 \times 800 = 50 \times 0.4 \times 8000$ . This indicates that both the values are equal. Hence, option (c) is the right answer. Remember that it is not necessary to calculate the values of the expressions in columns A and B.



#### **Tips**

You can't change the size of the font on the screen, unless you specifically request before the exam begins that a special ZOOM TEXT function be made available to you.

### ***Other Points to Remember While Solving Quantitative Comparison Questions***

1. Wherever possible, estimate the value of one or both the quantities.
2. In questions on Geometry, remember that figures are not necessarily drawn to scale.
3. In questions on Algebra, substitute simple numbers for algebraic expressions. Use positive numbers, negative numbers, fractions and zero before you decide on the answer choice.

## ***Multiple Choice — Select One Option***

### ***What the Questions Look Like***

In multiple choice questions with five options, you can choose only one option that is the most accurate.

### ***Sample Question***

A dealer bought two bikes for \$500 and sold them for a profit of \$182. He made a profit of 28% on one bike and 42% on the other bike. What is the cost price of the bike on which he made a profit of 28%?

- (a) \$100
- (b) \$200
- (c) \$300
- (d) \$400
- (e) \$500

### The Strategy to Answer Multiple Choice—Select One Option Questions

1. Compare the units of measurement used in the question to the units of measurement used in the choices.  
If they are not the same, convert the units in the question statement, to the units in the choices.
2. Check the reasonability of the options. For example, in the sample question, option (e) cannot be the answer as the dealer bought two bikes for \$500. In other words, \$500 cannot be the price of a single bike.
3. In some questions, it may be useful to work back from the choices. Remember that in GRE®, the values in the options are arranged in an increasing or decreasing order.  
Plug the value of option (c) into the question. If the dealer earned 28% profit on \$300, then the profit = 28% of 300 = \$84. Then the profit on the other bike = 42% of 200 = \$84. The total profit = \$84 + \$84 = \$168.  
Therefore, option (c) is not the answer. Now, if the dealer earned 28% profit on a cost price of \$200, then 28% of 200 = \$56. In this case, the cost of the other bike must be \$300. 42% of 300 = \$126. The total profit = \$56 + \$126 = \$182. Hence, option (b) is the answer.
4. In some questions, you may need to form an equation and check the values that fit the equation.
5. In case an answer has to be rounded, do it only in the last step.

### Other Points to Remember While Solving Quantitative Comparison Questions

In case your answer does not match any of the answer choices, then you might have (a) used the calculator incorrectly, or (b) not have accurately used the information given in the question, or (c) not used a correct line of reasoning.

### Multiple Choice—Select One or More Options

#### What the Questions Look Like

In some multiple choice questions you have to choose as many options as are right from a set of choices. One or more choices can be correct.

#### Sample Question

' $n$ ' is a natural number. Which of the following could be the units digit of  $13^{3n+2}$ ? (Indicate all such answer options).

- (a) 0
- (b) 1
- (c) 2
- (d) 3
- (e) 4
- (f) 5
- (g) 7
- (h) 9

**Answer:** (b), (d), (g), and (h).



#### Tips

If a question does not specify how many answer choices to select, select all the choices that apply.

The correct answer choice may be one of the choices or all of the choices depending on the question.

No credit is given to partially correct answers. If the question specifies how many answer choices to select, select exactly that many choices.



#### Tips

You may use one or more of the following approaches to answer the questions.

1. Use the conventional method of solving.
2. Work back from the answer choices to solve (back substitution).
3. Use the process of elimination (make a wise guess).



### ***The Strategy to Answer Multiple Choice—Select One or More Option Questions***

This type of question asks you to select multiple answer choices. Since there is no unique answer to these questions, it is very important to identify all possible outcomes for all the possibilities.

- Note that ‘ $n$  is a natural number’. This implies that ‘ $n$ ’ can be an integer (1 or more), hence  $3n + 2$  will always be an integer.
- Note the units digit of  $13^{3n+2}$ . It will be the same as the units digit of  $3^{3n+2}$ .
- Note that the different powers of 3 will always have the units digit as one of 3, 9, 7 and 1.

The units digit for  $13^{3n+2}$  will always be one of 3, 9, 7 and 1. Hence, the correct answer choices are (b), (d), (g), and (h).

### ***Numeric Entry Questions***

#### ***What the Questions Look Like***

In numeric entry questions there are no choices. You have to key in the answer in the box/boxes provided.

#### ***Sample Question***

Cathy buys a few 15 cent stamps and a few 29 cent stamps. If she spent a total of \$4.40, how many 29 cent stamps did she buy?

### ***The Strategy to Answer Numeric Entry Questions***

These type of questions might have incomplete information, and it is important to inspect the different possible outcomes, from the information given. Here, we can create an algebraic equation with two variables.

$$0.15x + 0.29y = 4.40.$$



#### **Tips**

Your answer may be an integer, a decimal, or a fraction, or it may be a negative.

Equivalent forms of the correct answer, such as 2.5 and 2.50, are correct. Fractions need not be reduced to the lowest terms, though you may need to reduce your fraction to fit in the grid.

The question has incomplete information and a second equation cannot be formed. Identify the hidden clue in the problem. For example, the number of stamps purchased by Cathy should always be an integer.

Multiply the given equation by 100 to simplify it.  $15x + 29y = 440$ .

Notice that  $x$  and  $y$  are integers.  $15x$  is a multiple of 15 and hence will have 0 or 5 in the units digit. 0 is the units digit in the result of the equation. Hence, the units digit of  $29y$  should also be 0 or 5. This is possible only when  $y$  is a multiple of 5.

Plug in the values of  $y$  as different multiples of 5 and find the corresponding value of  $x$ .

Observe that the equation is true when  $x = y = 10$ . Hence, 10 is the answer.

# CHAPTER 17

## Arithmetic

### ***Formulae Cheat Sheet***

#### ***Operations on Positive/Negative Integers***

- Positive + Positive = Positive
- Negative + Negative = Negative
- Positive  $\times$  Positive = Positive
- Positive  $\times$  Negative = Negative
- Negative  $\times$  Negative = Positive
- Positive  $\div$  Negative = Negative
- Negative  $\div$  Negative = Positive

#### ***Operations on Even/Odd Integers***

- Odd + Odd = Even
- Even + Even = Even
- Odd - Odd = Even
- Even - Even = Even
- Odd + Even = Odd
- Odd - Even = Odd
- Even  $\times$  Odd = Even
- Even  $\times$  Even = Even
- Odd  $\times$  Odd  $\times$  Odd  $\times$  .... = Odd

- Odd  $\div$  Even = Fraction
- Even  $\div$  Odd = Even (or Fraction)
- Odd  $\div$  Odd = Odd (or Fraction)

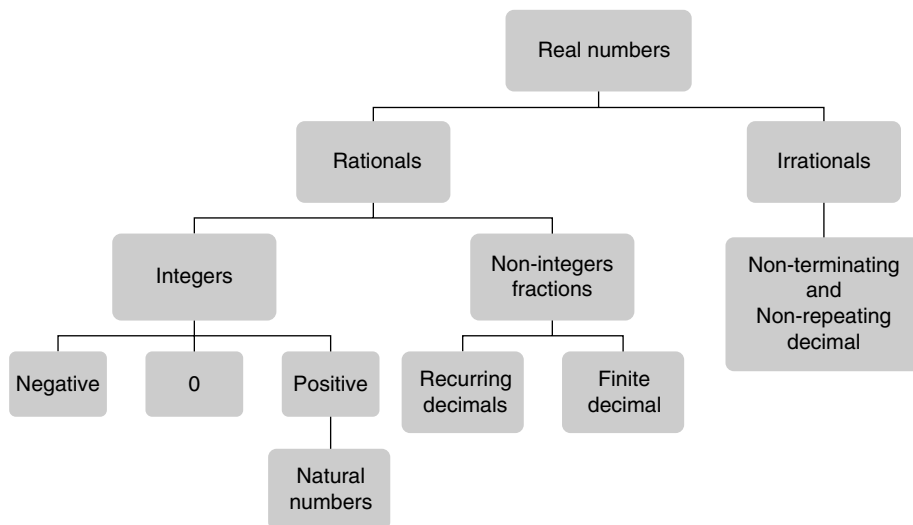
### **Squares and Square Roots**

$1^2 = 1$	$\sqrt{1} = 1$	$11^2 = 121$	$\sqrt{121} = 11$
$2^2 = 4$	$\sqrt{2} \cong 1.4$	$12^2 = 144$	$\sqrt{144} = 12$
$3^2 = 9$	$\sqrt{3} \cong 1.7$	$13^2 = 169$	$\sqrt{169} = 13$
$4^2 = 16$	$\sqrt{4} = 2$	$14^2 = 196$	$\sqrt{196} = 14$
$5^2 = 25$	$\sqrt{9} = 3$	$15^2 = 225$	$\sqrt{225} = 15$
$6^2 = 36$	$\sqrt{16} = 4$	$16^2 = 256$	$\sqrt{256} = 16$
$7^2 = 49$	$\sqrt{25} = 5$	$17^2 = 289$	$\sqrt{289} = 17$
$8^2 = 64$	$\sqrt{36} = 6$	$18^2 = 324$	$\sqrt{324} = 18$
$9^2 = 81$	$\sqrt{49} = 7$	$19^2 = 361$	$\sqrt{361} = 19$
$10^2 = 100$	$\sqrt{64} = 8$	$20^2 = 400$	$\sqrt{400} = 20$
	$\sqrt{81} = 9$	$21^2 = 441$	$\sqrt{441} = 21$
	$\sqrt{100} = 10$	$22^2 = 484$	$\sqrt{484} = 22$
		$23^2 = 529$	$\sqrt{529} = 23$
		$24^2 = 576$	$\sqrt{576} = 24$
		$25^2 = 625$	$\sqrt{625} = 25$

### **Basic Concepts in Arithmetic**

Questions on arithmetic test your knowledge on the following topics: Properties of integers, arithmetic operations (addition, subtraction, multiplication, division, and powers) on real numbers, operations on radical expressions, the number line, fractions and decimals, estimation, percent, absolute value on number line, ratios and proportions.

## Number System



**Note:** In GRE® the arithmetic section plays a vital role. The concepts in arithmetic are tested by applications and operations. The arithmetic can be broadly categorized as operations on integers, operations on real numbers, operations on radicals, operations on rational numbers, fundamental operations on (even/odd and positive/negative) integers, order of operations (PEMDAS), determining factors, divisibility rules, division algorithm, remainders, decimals and their place values, terminating and non-terminating decimals, and absolute values on number line. Advanced arithmetic concepts include ratios & proportions, problems on percentages which include percentage change, profit & loss, discounts, successive discounts, simple interest and compound interest, etc.

## Classification of Numbers

**Natural Numbers:** Numbers that are used for counting are known as natural numbers.

*Example:* 1, 2, 3, 4, .....

**Whole Numbers:** Natural numbers including '0' are known as whole numbers.

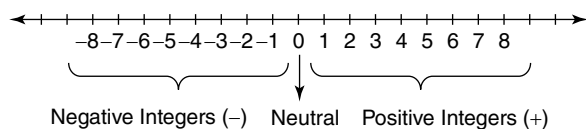
**Integers:** Positive and negative whole numbers together are known as integers. The set of integers is denoted by **I**.

*Example:* ..., -3, -2, -1, 0, 1, 2, 3 ...

### Positive/Negative Integers:

The numbers {..., -3, -2, -1, 0, 1, 2, 3 ...}, constitute the set of integers.

On the number line, negative integers are to the left of '0' and positive integers are to the right of '0'.



### Tips

**Non-negative integers:** Positive integers and zero.

### Note:

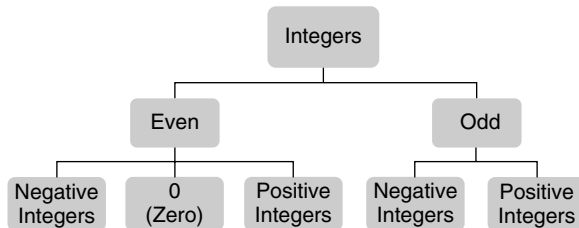
1. 0 is neither positive nor negative.
2. 0 is an even integer.

**Even/Odd Integers:**

- If an integer is evenly divisible by 2, then it is an even integer.
- If an integer is not evenly divisible by 2, then it is an odd integer.

*Example:* 4 is divisible by 2. Therefore, 4 is even.

5 is not divisible by 2. Therefore, 5 is odd.

**Prime Numbers**

Positive integers which have exactly two distinct divisors (factors) are called prime numbers.

**Tips**

All prime numbers are divisible only by 1 and itself.

- 1 is not a prime as it doesn't have two distinct divisors.
- 2 is the first and the only even prime number
- There are 25 prime numbers up to 100. They are:

2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, 97

**Composite Numbers**

Positive integers which have more than two distinct factors are called composite numbers. A composite number which has a positive divisor other than 1 and itself, is not a prime number.

*Example:* 4, 6, 8, 9, 10, 12, ...

**Note:** 0 and 1 are neither prime nor composite numbers.

**Fraction**

A fraction is a Latin word which means broken (*fractus*), it can be defined as a part of a whole. If an integer ( $p$ ) is evenly distributed into ' $q$ ' parts and that is not a whole number then the fractional form of a number is written as  $\frac{p}{q}$ .

More precisely, a number that can be expressed in the form of  $\frac{p}{q}$ , (where  $p$  and  $q$  are integers and  $q \neq 0, 1, -1$ ), are called fractions.

*Example:*  $\frac{2}{5}, \frac{7}{13}, \frac{17}{9}, \frac{-8}{11}$

**Tips**

Fractions and decimals can also be negative.

## Decimals (Decimal Form of a Number)

Fractions can also be written in decimal form. A number in a decimal form can be finite or infinite. To obtain a finite decimal from a fraction, just divide the numerator by the denominator.

There are three types of decimals:

- (i) **Terminating decimals** : Example,  $\frac{1}{4} = 0.25$
- (ii) **Recurring decimals** : Example,  $\frac{1}{3} = 0.33\dots = 0.\bar{3}$
- (iii) **Non-terminating and Non-recurring decimals** : Example,  $\sqrt{2} = 1.41421\dots$

In decimals, the position of decimal point (period) determines the place value of the digits. Thus, in 1234.5678, the following are the place values:

1234.5678

4 is in the 'ones' or 'units' place	5 is in the 'tenths' place
3 is in the 'tens' place	6 is in the 'hundredths' place
2 is in the 'hundreds' place	7 is in the 'thousandths' place
1 is in the 'thousands' place	8 is in the 'ten thousandths' place.

## Rational Numbers

The term rational comes from the word ratio. Numbers that can be expressed as the ratio of two integers are called rational numbers.

A number in the form  $p/q$  where  $p$  and  $q$  are integers and  $q \neq 0$  is a rational number.

Example:  $\frac{1}{2}, \frac{2}{3}, \frac{7}{6}, \frac{1}{9}, 5, 20, \dots$



### Tips

A rational number can be an Integer or a fraction.

## Irrational Numbers

A number that cannot be written as a fraction (or ratio) of two integers is called an irrational number. Non-terminating and non-recurring decimals are called as irrational numbers.

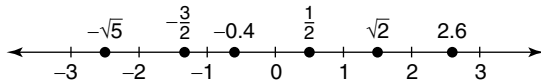
Example:  $\sqrt{2}, \sqrt{5}, \pi$

## Real Numbers

All rational and irrational numbers are together called real numbers.

Example:  $1, 2, \frac{1}{2}, \frac{7}{9}, \frac{1}{9}, 0.12, 10.003, \sqrt{2}, \sqrt{5}, \dots$

The set of real numbers can be shown on the **real number line**.



### Tips

In the GRE test, if the question contains unknown values or variables such as  $x$  and if the nature of  $x$  is not specified we have to consider  $x$  to be a real number.

- Each real number corresponds to a point on the real number line and each point corresponds to a real number. A real number can be positive, negative or zero (0).
- If the real number  $x$  is to the left of the real number  $y$  on the number line, then  $x$  is less than  $y$  ( $x < y$ ).
- If the real number  $x$  is to the right of the real number  $y$  on the number line, then  $x$  is greater than  $y$  ( $x > y$ ).
- If a real number  $y$  is between  $x$  and  $z$  on the number line, then  $x < y$  and  $y < z$ , which can be written as  $x < y < z$ .
- If  $y$  lies on  $x$  or  $z$  or any where between  $x$  and  $z$ , it is written as  $x \leq y \leq z$ .

Example: (A)  $-\sqrt{5} < -2$

(B)  $\frac{1}{2} > 0$

(C)  $1 < \sqrt{2} < 2$

(D)  $-20 < -5\frac{3}{4} < \frac{-8}{3} < 0 < 1.3 < 3$

**General Laws that Govern Real Numbers:** For all real numbers  $x$ ,  $y$  and  $z$

- |                               |     |                            |
|-------------------------------|-----|----------------------------|
| • $x + y = y + x$             | and | $xy = yx$                  |
| • $(x + y) + z = x + (y + z)$ | and | $(xy)z = x(yz)$            |
| • $x(y + z) = xy + xz$        | and | $x(y - z) = xy - xz$       |
| • $x + 0 = x$                 | and | $(x).(0) = 0; (x).(1) = x$ |

Example: If  $20.58 + (72.86 + 24.84) = (72.86 + x) + 20.58$  then  $x$  is

Solution:  $20.58 + (72.86 + \underline{24.84}) = (72.86 + x) + 20.58$   
 $\therefore x = 24.84$

Example:  $(50 \times 764 - 50 \times 264) \div 25 = ?$

Solution:  $[50(764 - 264)] \div 25 = (50 \times 500) \div 25 = \frac{25000}{25} = 1000$

## Number Properties

The test taker is expected to understand the result of operations such as addition, subtraction, multiplication and division. It is necessary to recognize and to work with positive, negative, odd, and prime numbers and to determine the factors of a number.

## Fundamental Operations

Remember the following expressions while carrying out the basic arithmetic operations

<b>Addition</b>	:	Addend + Addend = Sum
<b>Subtraction</b>	:	Minuend – Subtrahend = Difference
<b>Multiplication</b>	:	Factor × Factor = Product
<b>Division</b>	:	Dividend = (Divisor × Quotient) + Remainder

### Shortcut for the Sum of Consecutive Integers:

$$S_n = \frac{[\text{first term} + \text{last term}]}{2} \times n$$

where  $n$  = the number of terms.

$$1 + 2 + 3 + \dots + 100 = \frac{(1+100)}{2} \times 100 = 5050$$

$$2 + 3 + 4 + \dots + 100 = \frac{(2+100)}{2} \times 99 = 5049$$

Sum of the first  $n$  consecutive positive odd integers =  $n^2$

$$1 + 3 + 5 + \dots + n \text{ terms} = n^2$$

Sum of the first  $n$  consecutive non-negative even integers

$$0 + 2 + 4 + 6 + \dots + n \text{ terms} = n^2 - n$$

Sum of the first  $n$  consecutive positive even integers

$$2 + 4 + 6 + 8 + \dots + n \text{ terms} = n^2 + n$$

*Example:* Find the sum of all integers from 21 to 40.

*Solution:* The sum of the all integers from 21 to 40 =

The number of integers from 21 to 40 :  $40 - 21 + 1 = 20$ .

$$\begin{aligned} \therefore S_{20} &= \left( \frac{21+40}{2} \right) 20 \\ &= 61 \times 10 = 610 \end{aligned}$$

*Example:* Find the sum of all odd integers from 1 to 200.

*Solution:* The number of odd integers  $n = 100$

$\therefore$  The sum of odd integers from 1 to 200 =  $100^2 = 10000$ .

### What is unique about 0?

- Zero is an even integer.
- Zero is neither positive nor negative.
- Zero is not a factor of any number.
- Zero is divisible by every number.



### Tips

All numbers on the GRE are real numbers. Unless you're explicitly told that a specific type of number is involved, do not make any further assumptions. **DO NOT** assume that variables always represent positive integers.



### Tips

Number of integers from  $A$  to  $B$  inclusive =  $(B - A) + 1$ .

**Example:** How many consecutive integers are there from 73 through 419, both inclusive?

**Solution:**  $419 - 73 + 1 = 347$ .



### Tips

#### Note:

1.  $n^0 = 1$  ( $n \neq 0$ ).
2.  $0^n = 0$  ( $n \neq 0$ ).
3.  $0^0$  is undefined.
4.  $\left( \frac{0}{n} = 0 \text{ where } n \neq 0 \right)$ .
5.  $\frac{0}{0}$  is undefined.
6.  $n^1 = n$ .
7.  $1^n = 1$ .
8.  $n/0$  is undefined.



- Adding 0 to or subtracting 0 from any number will not result in any change:  $5 \pm 0 = 5$ .
- Multiplying a number with 0 results in 0.
- Dividing a number by 0 is not defined.
- Subtracting a number from itself results in 0:  $5 - 5 = 0$ .

### What is unique about 1?

- Multiplying or dividing a number by 1 results in no change:  $5 \times 1 = 5$ ;  $5 \div 1 = 5$ .
- Dividing a non-zero number by itself results in 1:  $5 \div 5 = 1$ .
- 1 is the only positive integer with one factor.
- 1 is a factor of every positive integer.
- 1 is neither a prime nor a composite number.

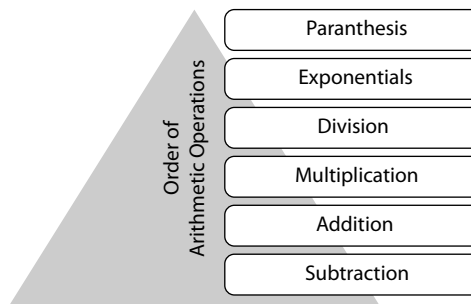
In the USA, the order of operations is symbolized by the acronym PEMDAS which stands for:

- Parenthesis
- Exponents
- Multiplication or Division (whichever comes first when moving from left to right)
- Addition
- Subtraction

Different countries use different acronyms for the same order. For instance, in a few countries which use British English, the acronym used is BODMAS.

For this guide, we have used the order PEDMAS. However, regardless of the acronym, the order is the same and results in the same answer.

## Order of Operations

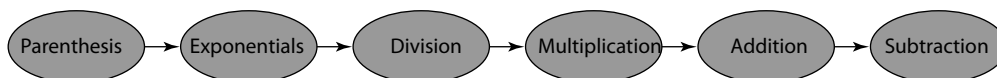


The acronym **PEDMAS** stands for:

1. **P**arenthesis, like  $()$ ,  $[\ ]$ ,  $\{ \}$  etc.
2. **E**xponent (Powers & square roots).
3. **D**ivision.
4. **M**ultiplication.
5. **A**ddition.
6. **S**ubtraction.

Parenthesis is used to group numbers; all operations within a parenthesis should be completed before performing operations in another parenthesis.

If the operations of multiplication, division, exponent, addition, parenthesis etc. are given in a problem, perform the operations mentioned in the order of the acronym PEDMAS. Start with parenthesis, and then proceed through exponents, division, multiplication, addition and subtraction.



Example:  $3 \times (5+8) - 2^2 / 4 + 3$

Order	Process	Result
Parenthesis	$5 + 8$	13
Exponent	$2^2$	4
Division	$2^{2/4}$ (2 power 2/4) = (4/4)	1
Multiplication	$3 \times (5 + 8) = 3 \times 13$	39
Addition and Subtraction (left to right)	$39 - 1 + 3$	41

Example:  $y = [5 - \{3(2 + 6)\}]$

- Terms inside parenthesis should be computed first.
- If there is no operation (+, -, ×, ÷) between a number and a bracket, then it is implied that the operation of multiplication has to be performed.

$$\begin{aligned}
 &2 + 6 = 8 \\
 &3(2 + 6) = 3(8) = 24 \\
 &5 - 3(2 + 6) = 5 - 3(8) = 5 - 24 = -19 \\
 \text{Hence, } &y = -19
 \end{aligned}$$



#### Tips

Simplification should be done first on the terms in the innermost BRACKET followed by FLOWER BRACKET followed by SQUARE BRACKET.

### Exponents (Powers)

Exponent of a number is the multiplication of the number with itself as many times as the exponent.

$a \times a \times a \dots$  ( $b$  times) is written as ' $a^b$ '

Example: 1.  $2 \times 2 \times 2 = 2^3 = 8$   
 2.  $3^2 = 9$

- An exponent or a power is a number, which shows how many times the base is used as a factor.
- To simplify the representation of repeated numbers, exponents are used.
- Exponents are also used to represent repeated multiplication of the same number.
- Use of exponents simplifies the representation.

Example:  $7^3 = (7)(7)(7)$       3: power      7: base  
 $5^3 = (5)(5)(5)$       3: power      5: base  
 $2^4 = (2)(2)(2)(2)$     4: power      2: base

- When a positive integer is raised to an even/odd power, the result is a positive integer.
- When a negative integer is raised to an even power, the result is a positive integer.
- When a negative integer is raised to an odd power, the result is a negative integer.

Example:  $(-6)^2 = (-6)(-6) = 36$   
 $(-2)^6 = (-2)(-2)(-2)(-2)(-2)(-2) = 64$   
 $(-3)^3 = (-3)(-3)(-3) = -27$

- When an integer with negative sign and without parenthesis is raised to a power, the result is a negative integer

Example:  $-4^2 = -16$

- An exponent can be positive or negative or zero.
- For any non-zero real number, 'a'.

$$a^0 = 1$$

$$a^{-1} = \frac{1}{a}; a^{-2} = \frac{1}{a^2}; a^{-3} = \frac{1}{a^3}$$

$$(a)(a^{-1}) = (a)\left(\frac{1}{a}\right) = 1$$

- When two terms with the same base are multiplied, the exponents are added

$$(a^m)(a^n) = a^{(m+n)}$$

i.e.,  $(a^3)(a^4)$

$$\Rightarrow (a \times a \times a)(a \times a \times a \times a)$$

$$\Rightarrow a \times a \times a \times a \times a \times a \times a$$

$$a^7 = a^{(3+4)}$$

Example:  $a^{-1} \times a^2 \times a^3 \times a^{-2} \times \frac{1}{a^{-3}}$

Solution:  $= \frac{1}{a} \times a^2 \times a^3 \times \frac{1}{a^2} \times \frac{1}{\frac{1}{a^3}}$

$$= \frac{1}{a} \times a^3 \times a^3 = \frac{a^{3+3}}{a} = \frac{a^6}{a} = a^{6-1} = a^5$$

(or)

$$a^{-1} \times a^2 \times a^3 \times a^{-2} \times \frac{1}{a^{-3}}$$

$$= a^{-1} \times a^2 \times a^3 \times a^{-2} \times a^3$$

$$= a^{-1+2+3-2+3} (a^m \times a^n = a^{m+n})$$

$$= a^5$$

Example: If  $k^a \times k^b = k^a$  ( $k$  is a prime number), then find the value of  $b^3$ .

Solution:  $K^a \times k^b = k^a$

$$K^{a+b} = k^a$$

$$\therefore a + b = a \quad (\because \text{If } a^m = a^n \text{ then } m = n)$$

$$b = a - a$$

$$b = 0,$$

Hence  $b^3 = 0$



### Tips

Every number greater than 1 can be written as a product of prime powers.



### Tips

**Note 1:**  $(a^m)^n = a^{m \times n}$

**Note 2:**  $(a^m)^n$  is not necessarily  $a^{(m)^n}$

**Example:**

$$(2^2)^2 = 2^{(2)^2} \Rightarrow 2^{2 \times 2} = 2^4$$

$$(2^3)^4 \neq 2^{(3)^4} \Rightarrow 2^{3 \times 4} \neq 2^{81}$$

*Example:* If  $x \neq 0$

<b>Column A</b>	<b>Column B</b>
-----------------	-----------------

$x^{x^x}$	$x^x$
-----------	-------

- (A) Quantity A is greater.  
 (B) Quantity B is greater.  
 (C) The two quantities are equal.  
 (D) The relationship cannot be established.

*Solution:* If  $x = 1$  Column (A) = Column (B)

If  $x = 2$  Column (A) > Column (B)

Since, Column (A) and Column (B) cannot be compared uniquely, the answer is (D).

## Squares, Square Roots (Radicals), and Absolute Values

For a variety of reasons that will become more clear to you as you progress, it is very important that you remember the squares and square roots of certain numbers. Although the test provides an on-screen calculator, remembering this will help you save a lot of time in the examination.

The squares, square roots and absolute values are related to one another.

That is  $\sqrt{x^2} = |x|$

**Square:** The GRE® includes only real numbers. Therefore, the square of any number is always positive. The GRE® tests two different applications on squares.

(1) Square of an integer. (2) Square of a decimal.

$x^2 > x$ , if  $x$  is an integer (or)  $x$  is a negative decimal

$x^2 < x$ , if  $x$  is a positive decimal

*Example:* (1)  $2^2 > 2$  (2)  $(-0.5)^2 > -0.5$  (3)  $(0.1)^2 < 0.1$

**Square Root (radical):** Every non-negative real number ( $r$ ) has a unique non-negative square root of a number ( $n$ ).

That is  $\sqrt{n} = r$ , where ' $n$ ' is a non-negative number and ' $r$ ' is the root of ' $n$ '.

The symbol  $\sqrt{\quad}$  is called 'radical' and  $r \times r = \sqrt{n} \times \sqrt{n} = n$

That is  $n = r^2$  where  $r^2 = n \Rightarrow r = \pm\sqrt{n}$

**Note:** The square root of a number is never negative.

That is the radical ( $\sqrt{\quad}$ ) will never give negative sign.

*Example:*  $x^2 = 64 \Rightarrow x = \pm\sqrt{64} \Rightarrow x = \pm 8$

*Example:*  $x = \sqrt{64} \Rightarrow x = 8$

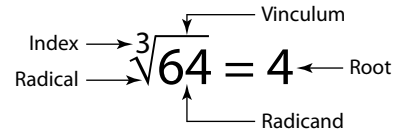


### Tips

- $a^m \times a^n = a^{m+n}$
- $a^m \times b^n = (ab)^m$
- $(\sqrt{a})^n = \sqrt{a^n} = a^{n/2}$

**Radical expression of  $n^{\text{th}}$  order**

- The number 64 is also called ‘the argument of the radical’.
- The expression is read as ‘cube root of sixty four’.

**Laws of Radicals**

$$\text{I. } \sqrt{a^2} = a \text{ and } (\sqrt{a})^2 = a \quad (\text{a) } (\sqrt{36^2}) = 36 \text{ and } (\sqrt{36})^2 = 36$$

$$\text{II. } (\sqrt{a})(\sqrt{b}) = \sqrt{ab} \quad (\text{b) } (\sqrt{4})(\sqrt{6}) = \sqrt{24}$$

$$\text{III. } \frac{\sqrt{a}}{\sqrt{b}} = \sqrt{\frac{a}{b}} \quad (\text{c) } \frac{\sqrt{21}}{\sqrt{27}} = \sqrt{\frac{21}{27}} = \sqrt{\frac{7}{9}}$$

If  $\sqrt[n]{a}$  and  $\sqrt[n]{b}$  are two radicals of the  $n^{\text{th}}$  order, then

$$\text{IV. } \sqrt[n]{a} \times \sqrt[n]{b} = \sqrt[n]{ab} \quad (\text{d) } (\sqrt[n]{a} \times \sqrt[n]{b})^n = (\sqrt[n]{ab})^n = ab$$

$$\text{V. } \frac{\sqrt[n]{a}}{\sqrt[n]{b}} = \sqrt[n]{\frac{a}{b}} \quad (\text{e) } \left(\frac{\sqrt[n]{a}}{\sqrt[n]{b}}\right)^n = \left(\sqrt[n]{\frac{a}{b}}\right)^n = \frac{a}{b}$$

$$\text{VI. } \sqrt[n]{a^p} = a^{\frac{p}{n}} \quad (\text{f) } \sqrt[8]{2^4} = 2^{\frac{4}{8}} = 2^{\frac{1}{2}} = \sqrt{2} = 1.414$$

$$\text{VII. } \sqrt[m]{\sqrt[n]{a}} = \sqrt[mn]{a} = \sqrt[n]{\sqrt[m]{a}} \quad (\text{g) } \sqrt[3]{\sqrt[2]{128}} = \sqrt[6]{128} = \sqrt[6]{2^7} = 2^{\frac{7}{6}} = 2.121$$

*Example:* Let  $a^2 = 169$ ,  $b = \sqrt{169}$

Column A	Column B
$b$	$a$

- A. Quantity A is greater.  
 B. Quantity B is greater.  
 C. The two quantities are equal.  
 D. The relationship cannot be established.

*Solution:*  $a^2 = 169 \Rightarrow a = \pm 13$  and  $b = \sqrt{169} = 13$ .

If  $a = 13$  then Col A = Col B.  
 and if  $a = -13$  Col A > Col B.

Hence, answer is option D.

Since the quantities in both the columns cannot be uniquely compared.

**Tips**

The values given below are the approximate values when the number is rounded to the nearest thousandths decimal place.

$$\sqrt{2} \cong 1.414$$

$$\sqrt{3} \cong 1.732$$

$$\sqrt{5} \cong 2.236$$

## Absolute Value on a Number Line

The absolute value of a number is defined as the distance of a number from the origin (zero), this is also referred to as modulus, hence the absolute value of a number can never be negative.

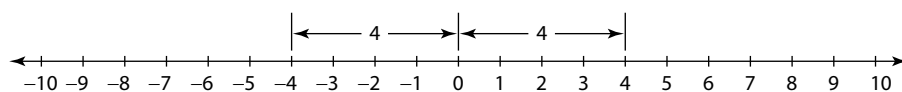
While taking a number out of modulus, always consider the positive and the negative values of the number.

$$|a| = \begin{cases} a & \text{if 'a' is positive i.e., } a > 0 \\ -a & \text{if 'a' is negative i.e., } a < 0 \\ 0 & \text{if } a = 0 \end{cases}$$

Example:  $|-9| = 9$  and  $|9| = 9$

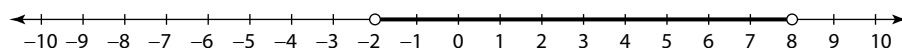
**Note:**  $|a| \times |b| = |ab|$ ; where  $a, b$ , are positive or negative

**Number Lines (VS) Absolute Value:** When performing operations on real numbers, the number line is used to represent the interval of the variable (unknown value), which in turn can be represented with the help of absolute values.



The absolute value of 4 is 4, and the absolute value of  $-4$  is also 4, this is represented as  $|x| = 4$ .

**Note:** If  $x$  takes all the values between  $-2$  and  $8$  exclusive, on the number line,  $x$  can be represented as shown. This is written as  $|x - 3| < 5$



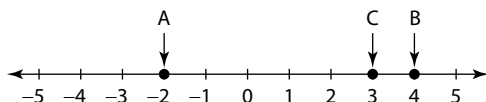
### Practice Questions on Number Properties:

- If the sum of 5 consecutive integers is  $k$ , then what is the sum of the next 3 consecutive integers in terms of  $k$ ?
- Let  $n$  be the number of primes between 10 and 20 and  $m$  be the number of primes between 50 and 60, then  $|m - n| = ?$
- Find the number of composite numbers between 20 and 50.
- Which of the following must be true?
  - Even  $\div$  Odd = Even
  - Odd  $\div$  Even = Fraction
  - Odd  $\times$  Odd = Odd

5.  $\frac{2}{5} \times \frac{3}{7} \times \frac{21}{8} \times \frac{35}{9} = \underline{\hspace{2cm}}$

6.  $(0.125) \times (0.333) \times (\sqrt{288}) \div (\sqrt{2 \div 4}) = \underline{\hspace{2cm}}$

7. On the number line  $B - A + C$  is how many times of  $B - C - A$ ?



8.  $(4321 \div 125 - 23 \div 21 \cdot 5^3) \times 5^4 \div 10^{-3} = \underline{\hspace{2cm}}$

9.  $\sqrt{51^2 - 49^2} = ?$

10. If  $\sqrt{x+12} = 225$ , then  $x = ?$



### Tips

**Note:** The application of absolute values is mostly tested with inequalities and equations in algebra.



### Tips

A prime number greater than 3 can be expressed in the form of  $6k \pm 1$ , where as every number in the form of  $6k \pm 1$  need not be a prime number.

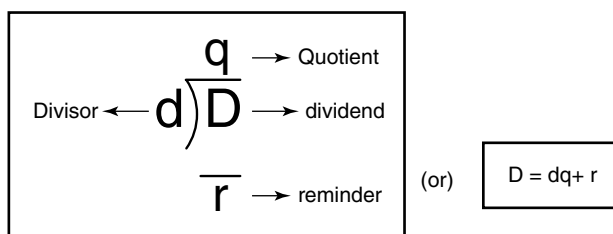
11. If  $a^3 + b^3 = 1729$ ,  $a$  and  $b$  are positive integers, then what is the value of  $a$ ? (Indicate all possible answers)

- a) 0   b) 1   c) 7   d) 9   e) 10   f) 11   g) 13   h) 15

12. Find the square root of  $\frac{2^{(4-2)^3}}{[2^{(4-2)}]^3}$

### Division Algorithm

If ' $D$ ' is an integer and ' $d$ ' is a positive integer, then there exists unique integers ' $q$ ' and ' $r$ ' such that  $D = dq + r$  and  $0 \leq r < d$



Quotient ' $q$ ' is the result of division.

Remainder ' $r$ ' is the number left after the division of two integers.



#### Tips

Divisibility of positive numbers:

1. If remainder is 0 and quotient is an integer, the divisor and quotient are factors of the dividend.
2. If the quotient is not an integer the divisor is not a factor of the dividend.
3. The remainder is always less than the divisor.

Divisor ' $d$ ' is an integer which divides another integer. It is also called a factor. Dividend ' $D$ ' is the integer which is being divided.

### Divisibility of Numbers

A question may require you to find the remainder when one number is divided by another, or more specifically, may require you to find the remainder in order to determine whether the divisor is a factor of the original number. When 22 is divided by 5, the quotient is 4 and the remainder is 2.

When 20 is divided by 5, the quotient is 4 with no remainder. In this case, 4 and 5 are called factors of 20.

### Divisibility Rules

A **divisibility rule** is an easy way of ascertaining whether a given number is divisible by a divisor without actually performing the division. This can be done by merely examining the digits of the given number. Operations and calculations can be performed quickly if one has knowledge of divisibility rules. In the GRE®, questions requiring application of divisibility rules are of two types:

1. Those which involve numerical values.
2. Those which involve unknown values.

Divisor	Divisibility Condition	Examples
1.	Automatic	Any integer is divisible by 1.
2.	The last digit is even (0, 2, 4, 6, or 8).	1,294: 4 is even.
3.	The sum of the digits is divisible by 3. For large numbers, digits may be summed iteratively.	$405 \Rightarrow 4 + 0 + 5 = 9$ and $636 \Rightarrow 6 + 3 + 6 = 15$ both are clearly divisible by 3. $16,499,205,854,376 \Rightarrow$ $1 + 6 + 4 + 9 + 9 + 2 + 0 + 5 + 8 + 5 + 4$ $+ 3 + 7 + 6$ sums to $69 \Rightarrow 6 + 9 = 15 \Rightarrow 1 + 5 = 6$ , which is clearly divisible by 3.
4.	The last two digits are divisible by 4.	40832: 32 is divisible by 4.
5.	The last digit is 0 or 5.	495: the last digit is 5.
6.	If the number is divisible both by 2 and by 3 then it is divisible by 6.	1,458: $1 + 4 + 5 + 8 = 18$ , so it is 3 and the last digit is even, hence the number is divisible by 6.
7.	From the alternating sum of blocks of three from right to left. 1,369,851: $851 - 369 + 1 = 483 = 7 \times 69$ . Subtract 2 times the last digit from the rest. 483: $48 - (3 \times 2) = 42 = 7 \times 6$ . Or, add 5 times the last digit to the rest.	1,369,851: $851 - 369 + 1 = 483 = 7 \times 69$ 483: $48 - (3 \times 2) = 42 = 7 \times 6$ 483: $48 + (3 \times 5) = 63 = 7 \times 9$
8.	If the last three digits of a number are zeroes or divisible by 8, then it is divisible by 8.	34152: Examine divisibility of just 152: $19 \times 8 = 152$
9.	The sum of the digits is divisible by 9. For larger numbers, digits may be summed iteratively.	2,880: $2 + 8 + 8 + 0 = 18$ ; $1 + 8 = 9$ .
10.	If the last digit is 0, the number is divisible by 10.	130: The last digit is 0.
11.	(a) Add all the digits in the odd places. (b) Add all the digits in the even places. If the difference of (a) and (b) is zero or divisible by 11 then the number is divisible by 11.	$918,082 = \overbrace{918,082}$ $= 9 - 1 + 8 - 0 + 8 - 2 = 22$ .
12.	It is divisible by 3 and by 4.	324: It is divisible by 3 and 4.
13.	Add the digits in alternate blocks of three from right to left, and then subtract the two sums. Add 4 times the last digit to the rest.	2,911,272: $(2 + 272) + 911 = 637$ . 637: $63 + (7 \times 4) = 91$ , $9 + (1 \times 4) = 13$ .
14.	It is divisible both by 2 and by 7. Add the last two digits to twice the rest. The answer must be divisible by 14.	224: It is divisible both by 2 and by 7. 364: $(3 \times 2) + 64 = 70$ .
15.	It is divisible both by 3 and by 5.	390: It is divisible both by 3 and by 5.



16.	If the thousands digit is even, examine the number formed by the last three digits. If the thousands digit is odd, examine the number formed by the last three digits plus 8. Add four times the number formed by all except the last two digits to the number formed from the last two digits.	254,176: 176. 3,408: $408 + 8 = 416$ . 176: $(1 \times 4) + 76 = 80$ . 1168: $(11 \times 4) + 68 = 112$ .
17.	Subtract 5 times the last digit from the rest.	221: $22 - (1 \times 5) = 17$ .
18.	It is divisible by 2 and by 9.	342: It is divisible by 2 and by 9.
19.	Add twice the last digit to the rest.	437: $43 + (7 \times 2) = 57$ .
20.	It is divisible by 10, and the tens digit is even. If the number formed by the last two digits is divisible by 20.	360: It is divisible by 10, and 6 is even. 480: 80 is divisible by 20.

## Divisions

In division, four types of calculations are possible:

- An odd number divided by an even number.
- An even number divided by an odd number.
- An odd number divided by an odd number.
- An even number divided by an even number.

1. Dividing an odd number by an even number always results in a fraction and not an integer.

$$9 \div 2 = \frac{9}{2} = 4\frac{1}{2} = (\text{Odd} \div \text{Even} = \text{Fraction})$$

2. If a divisor which is an odd number is a factor of a dividend which is an even number, the result is an even integer.

$$\begin{aligned} 6 \div 3 = 2 &\Rightarrow \text{Even} \div \text{Odd} = \text{Even} \\ 28 \div 7 = 4 &\Rightarrow \text{Even} \div \text{Odd} = \text{Even} \\ &\text{Or} \end{aligned}$$

If the divisor is not a factor, then, the result is a fraction.

$$\begin{aligned} 6 \div 5 = \frac{6}{5} = 1\frac{1}{5} &\Rightarrow \text{Even} \div \text{Odd} = \text{Fraction} \\ 28 \div 9 = \frac{28}{9} = 3\frac{1}{9} &\Rightarrow \text{Even} \div \text{Odd} = \text{Fraction} \end{aligned}$$

3. If a divisor which is an odd number is a factor of a dividend which is also an odd number, the result is an odd integer.

$$\begin{aligned} 15 \div 5 = 3 &\Rightarrow \text{Odd} \div \text{Odd} = \text{Odd} \\ 21 \div 3 = 7 &\Rightarrow \text{Odd} \div \text{Odd} = \text{Odd} \\ &\text{Or} \end{aligned}$$



### Tips

In GRE, application of the divisibility is tested in the concepts of remainders, mixed fractions, operations on integers, etc.



## 5 Column A

Remainder when  $8^{8n+5} + 8$   
is divided by 10

## Column B

8

6. Let  $n$  be a remainder when product of 5 consecutive integer is divided by 6.

## Column A

 $n$ 

## Column B

1

7. If ' $x$ ' is an integer, what is the remainder, when the 3 digit number  $4 \times 3$  is divided by 4 (Indicate all possible answers).

(a) 0                      (b) 1                      (c) 2                      (d) 3                      (e) 4

8. What is the least possible value of  $x$  such that the 3 digit number  $48x$  is divisible by 7?

(a) 1                      (b) 3                      (c) 5                      (d) 7                      (e) 9

9. If  $x + y + z$  is divisible by 3, what is the least possible value of the product of the three numbers  $x$ ,  $y$ , and  $z$ ?

10. When positive integer  $x$  is divided by  $y$  the remainder is 6 and  $\frac{x}{y} = 12.12$  then find all the possible values of  $y$ .

**Tips**

**Note:** If  $n$ ,  $m$  are positive integers and  $n < m$ , then  $n$  is the remainder when  $n$  is divided by  $m$ .

*Example:* When 2 is divided by 3, the remainder is 2.

## Factorization Algorithm

**Prime factorization** of integers is the decomposition of a composite number into smaller non-trivial divisors, which when multiplied together equal the original integer.

*Example:*  $18 = 2 \times 9 = 2 \times 3 \times 3$

## Algorithm

The prime factorization algorithm can be precisely defined as non-prime numbers. If a given number is not prime, then the number must have at least one prime factor less than or equal to the square root of itself.

This algorithm will help you identify the factors of a number. For example, 133. Let us assume that 133 is not prime. If our assumption is correct, we should be able to find at least one prime factor smaller than the square root of 133, which is between 11 and 12

$$11^2 = 121 \text{ and } 12^2 = 144$$

133 is between 121 and 144. Hence, the possible numbers are 2, 3, 5, 7 and 11. By inspection, both 2 and 5 can be eliminated because the last digit is not even or '0' or '5'. 11 can be eliminated because  $11 \times 12 = 132$  and 3 can be eliminated, because the sum of digits is not 3. However, 7 is a factor of 133, and therefore, 133 is not prime.

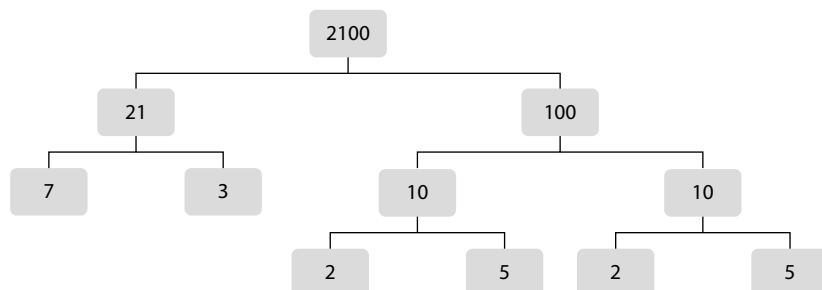
**Tips**

A composite number can be written as the product of prime powers.  
eg:  $18 = 2^1 \times 3^2$ .

*Example:* Find the prime factorization of 2100. Is 2100 divisible by

- (i) 35?      (ii) 75?      (iii) 125?

*Solution:* Prime factorization of 2100



Hence,  $2100 = 2 \times 2 \times 3 \times 5 \times 5 \times 7$ .

Divisor	Prime Factors	Divisible	Reason
35	$5 \times 5$	Yes	$5 \times 7$ is a factor of 2100
75	$3 \times 5 \times 5$	Yes	$3 \times 5 \times 5$ is a factor of 2100
125	$5 \times 5 \times 5$	No	$5 \times 5 \times 5$ is not a factor of 2100

*Example:*  $810 = 2 \times 3 \times 3 \times 3 \times 3 \times 5$

*Example:*  $9009 = 3 \times 3 \times 7 \times 11 \times 13$

## Determining Factors

On the test it is often required to identify the factors of a number.

**Prime factors:** If you want to determine prime factors of a composite number, you must write the number as product of prime powers. Let  $C$  be a composite number then the number is prime factorized as

$$C = P_1^{\alpha_1} P_2^{\alpha_2} P_3^{\alpha_3} \dots P_k^{\alpha_k}$$

where  $P_1, P_2, \dots, P_k$  are distinct prime numbers and  $\alpha_1, \alpha_2, \dots, \alpha_k$  are their powers respectively.

1. Number of factors of  $C = (\alpha_1 + 1)(\alpha_2 + 1) \dots (\alpha_k + 1)$ .
2. Distinct prime factors:  $P_1, P_2, \dots, P_k$ .
3. Total number of prime factors:  $\alpha_1 + \alpha_2 + \dots + \alpha_k$ .

*Example:* If the length of a number ' $n$ ' is defined as  $l(n) =$  total number of prime factors of the number. Find  $l(n)$  and the total number of factors of 18.

*Solution:*

$$18 = 2^1 \times 3^2.$$

$$\text{Length} = 1 + 2 = 3.$$

$$\text{Total number of factors} = (1 + 1)(2 + 1) = 6.$$



### Tips

1. Every number is a factor of itself.
2. Number of factors (divisors) of an integer are finite.

## Common Multiples

A common multiple is a number that is a multiple of all the given numbers.

### Least Common Multiple (LCM)

The Least Common Multiple (LCM) is the smallest common multiple of two or more numbers.

*Example:* Positive multiples of 15: 15, 30, 45, **60**, 75, 90, 105, **120**, 135, 150 ...

Positive multiples of 20: 20, 40, **60**, 80, 100, **120** ...

Hence, positive multiples common to 15 and 20 are **60, 120, 180,...**

The smallest of these common multiples (**60, 120 ...**) is **60**

∴ LCM of 15 and 20 is **60**



#### Tips

1.  $x$  is called a multiple of  $y$  if  $x = yk$ , where  $x$ ,  $y$ ,  $k$  are positive integers.
2. Multiples are always positive integers.

### Prime Factorization Method to Find LCM

**Step 1:** Simplify both the numbers into products of their prime factors.

**Step 2:** Separate the common factors.

**Step 3:** Multiply the common factors and the remaining factors to deduce the LCM.

*Example:* Find the LCM of 15 and 20 by using the prime factorization method.

*Solution:*  $15 = 3 \times 5$

$20 = 2 \times 2 \times 5$

Common factor of 15 and 20 is only 5, the remaining factors are 3, 2 and 2

∴ The LCM of 15 and 20 is  $5 \times 3 \times 2 \times 2$ .

Hence, LCM of 15 and 20 is 60.

*Example:* LCM of 12 and 16

**Step 1:** Split both the numbers into their respective prime factors.

$12 = 2 \times 2 \times 3$ ;       $16 = 2 \times 2 \times 2 \times 2$

**Step 2:** Separate the common factors. 2 and 2 are the common factors and 3, 2 and 2 are the remaining factors of 12 and 16.

**Step 3:** Multiply common factors and the remaining factors of both the numbers to deduce the LCM.

∴ LCM of 12 and 16 =  $\underline{2 \times 2} \times \underline{3 \times 2 \times 2} = 48$ .

*Example:* The least number which is exactly divisible by 24 and 30 is.

*Solution:* LCM is the least number which is exactly divisible by 24 and 30

L.C.M =  $6 \times 4 \times 5 = 120$



#### Tips

1. Every number is the least multiple of itself.
2. The multiples of a number are infinite.

**Common Divisor:** The positive integer that divides two or more non-zero integers is called as common divisor. The least positive integer that divides any non-zero integer is one.

**Greatest Common Divisor (GCD) or Highest Common Factor (HCF):** The greatest common divisor is the largest positive integer that divides two or more non-zero integers. The Highest Common Factor (HCF) is the largest factor common to two or more numbers.

**Method**

**Step 1:** Convert the given numbers into its prime factors.

**Step 2:** Find the product of the prime factors common to all the numbers.

**Step 3:** The product will be the HCF.

*Example:* Positive divisors of **45**: **1, 3, 5, 9, 15** and 45.

Positive divisors of **60**: **1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30** and 60.

Hence, positive common divisors of both 45 and 60 are 1, 3, 5, and 15 the greatest of these common divisors is 15.

$\therefore$  GCD or HCF of 45 and 60 is **15**.

**Co-prime Numbers (Relative Primes):** Two natural numbers are called co-prime numbers, if they have no common factor other than 1. In other words, the HCF of co-primes is 1.

**Note:** If two numbers  $a$  and  $b$  are co-primes, they need not be prime numbers.

*Example:* (A) (3, 5) (B) (8, 9) (C) (20, 23)

*Example:* Find the HCF of 45 and 60.

*Explanation:* Follow the steps mentioned above

$$\begin{aligned} 45 &= 3 \times 3 \times 5 &= & 3 \times 5 \times 3 \\ 60 &= 2 \times 2 \times 3 \times 5 &= & 3 \times 5 \times 2 \times 2 \end{aligned}$$

The product of common divisors of 45 and 60 is  $3 \times 5 = 15$ .

HCF = 15.

*Example:* Find the HCF of 64 and 84.

$$\begin{aligned} 64 &= 2^2 \cdot 2^2 \times 2^2 \\ 84 &= 2^3 \times 3 \times 7 \\ \text{HCF} &= 2^2 = 4 \end{aligned}$$

*Example:* Find the greatest number, which divides 50 and 95 exactly.

*Solution:* HCF is the greatest number which divides 50 and 95 exactly.

$$\begin{aligned} 50 &= 5 \times 5 \times 2 \\ 95 &= 5 \times 19 \\ \text{HCF} &= 5 \end{aligned}$$

*Example:*  $4 \times 8 = 32$ , LCM of 4 and 8 is 8 and HCF of 8 and 4 is 4.

$$(\text{LCM}) \times (\text{HCF}) = 8 \times 4 = 32$$

*Example:* LCM and HCF of two numbers is 120 and 6. If one of the numbers is 24, then the other number is

$$\begin{aligned} \text{Other number} &= \frac{L \times H}{\text{given number}} \\ &= \frac{120 \times 6}{24} = 30 \end{aligned}$$

**Tips**

GCD of  $a$  and  $b = G$

LCM of  $a$  and  $b = L$ .

The product of two numbers  $a$  and  $b$  is equal to the product of their GCD and LCM

That is  $a \times b = G \times L$ .

**Tips**

The product of any two numbers is equal to the product of their HCF and LCM.

## Fractions

A fraction is an expression which indicates that it is a part of a whole. A fraction is expressed in the form  $\frac{p}{q}$ .

$$\frac{p}{q} = \frac{\text{Numerator}}{\text{Denominator}}$$

where  $p$  and  $q$  are integers and  $q \neq 0, -1, 1$ .

*Example:* In the fraction  $\frac{5}{3}$ , the number **5** is called the numerator and the number **3** is called the denominator.

The fraction  $\frac{3}{4}$  is read as three-fourths. **4** is the total number of parts of the unit, **3** is the number of parts considered.

## General Rules of Fractions

If both the numerator and the denominator are integers and the denominator is a non-zero number, then the fraction is called a rational number.



### Tips

On the number line a negative decimal value is mathematically represented as a negative fraction but when we say a fraction is a part of a whole, a negative part of a whole does not hold true.

*Example:*  $-0.5 = \frac{-1}{2}$

*Example:*  $\frac{2}{5}, \frac{3}{7}, \frac{4}{7}, \frac{3}{2}, \frac{8}{3}, \dots$

If both the numerator  $p$  and the denominator  $q$  are multiplied by the same non-zero integer, the result is an equivalent fraction of  $p/q$ .

*Example:*  $\frac{7}{12} = \frac{(7)(3)}{(12)(3)} = \frac{21}{36}$

*Example:*  $\frac{-9}{22} = \frac{(-9)(-1)}{22(-1)} = \frac{9}{-22} = -\frac{9}{22}$

## Multiplicative Inverse

A number ' $a$ ' is said to be a multiplicative inverse of a number ' $b$ ', if  $a \times b = 1$ .

## Reciprocal

A reciprocal is the multiplicative inverse of a number.

- A fraction  $\frac{p}{q}$ , where  $p$  and  $q$  are non-zero integers, has a multiplicative inverse which is  $\frac{q}{p}$ , i.e.  $\frac{p}{q} \times \frac{q}{p} = 1$ .
- For example,  $\frac{2}{3}$  is the reciprocal of  $\frac{3}{2}$ .
- In a fraction when the signs of the numerator and the denominator are interchanged, the value of the fraction does not change.

*Example:*  $\frac{7}{-8} = \frac{7 \times (-1)}{-8 \times (-1)} = \frac{-7}{8}$

$\frac{-11}{-12} = \frac{-11 \times (-1)}{-12 \times (-1)} = \frac{11}{12}$

**Note:** If either the numerator or the denominator of a fraction is negative, then the fraction can be written with a negative sign in front of it.

$$\text{Example: } \frac{-12}{19} = -\frac{12}{19}$$



**Tips**  
Zero (0) does not have a multiplicative inverse.

### Types of Fractions

- **Simple Fraction:** A fraction in which both the numerator and the denominator are positive integers and have no common factors.

$$\text{Example: } \frac{3}{5}, \frac{3}{2}$$

- Fractions are expressed in the lowest terms

$$\text{Example: (a) } \frac{36}{72} = \frac{18}{36} = \frac{6}{12} = \frac{1}{2}$$

$$\text{(b) } \frac{11}{121} = \frac{1}{11}$$

- **Like Fractions:** A collection of fractions with the same denominators

$$\text{Example: } \frac{2}{5}, \frac{4}{5}, \frac{1}{5}, \frac{3}{5}$$

- **Unlike Fractions:** A collection of fractions with unequal denominators.

$$\text{Example: } \frac{2}{7}, \frac{2}{3}, \frac{1}{5}, \frac{3}{2}$$

- **Proper Fraction:** A fraction in which the numerator is less than the denominator. All proper fractions are less than 1.

$$\text{Example: } \frac{2}{3}, \frac{4}{7}, \frac{3}{5}, \frac{3}{8}$$

- **Mixed Fraction:** A fraction in which the numerator is greater than the denominator.

Fraction  $\frac{p}{q}$ , where  $p > q$ , is a mixed fraction. We can further simplify mixed fractions as shown below:

$$\text{Example: } \frac{23}{7} = 3\frac{2}{7}, \frac{14}{3} = 4\frac{2}{3}, \frac{22}{5} = 4\frac{2}{5}, \frac{7}{2} = 3\frac{1}{2}$$

- **Equivalent Fractions:** Fractions that have the same value as the original fraction.

$$\text{Example: } \frac{2}{3}, \frac{4}{6}, \frac{6}{9}, \frac{8}{12}, \dots; \frac{1}{2}, \frac{2}{4}, \frac{3}{6}, \frac{4}{8}, \dots$$

- **Complex (Compound) Fraction:** A fraction in which the numerator, or the denominator, or both, are fractions.

$$\text{Example: (i) } \frac{3/5}{2} = \frac{3/5}{2/1} = \frac{3}{5} \times \frac{1}{2} = \frac{3}{10}$$

$$\text{(ii) } \frac{2}{\left(\frac{3}{7}\right)} = \frac{2/1}{3/7} = \frac{2}{1} \times \frac{7}{3} = \frac{14}{3}$$

$$\text{(iii) } \frac{\frac{3}{8}}{\left(\frac{8}{9}\right)} = \frac{3}{8} \times \frac{9}{8} = \frac{27}{64}$$



### Comparing Fractions with Different Denominators

**Step 1:** Find the L.C.M of the denominators, and find the quotient for each denominator by dividing the L.C.M. with the denominator value.

**Step 2:** Divide the numerator and the denominator with the quotient value, to convert the denominators into L.C.M. of the denominators.

**Step 3:** When the denominators of all the fractions are the same, compare the numerators.

*Example:* Compare  $\frac{4}{9}$ ,  $\frac{2}{6}$ .

*Solution:* LCM of the denominators 9 and 6 is 18.

To make the fractions equivalent, multiply  $\frac{4}{9}$  by  $\frac{2}{2}$  and  $\frac{2}{6}$  by  $\frac{3}{3}$ .

$$\frac{4}{9} \times \frac{2}{2} = \frac{8}{18}$$

$$\frac{2}{6} \times \frac{3}{3} = \frac{6}{18}$$

Compare  $\frac{8}{18}$  and  $\frac{6}{18}$

8 is greater than 6, and  $\frac{8}{18}$  is greater than  $\frac{6}{18}$ . Hence,  $\frac{4}{9}$  is greater than  $\frac{2}{6}$ .

### Addition of Fractions With the Same Denominators

The sum of fractions with the same denominators can be calculated by adding all the numerators without changing the denominator.

*Example:*  $\frac{3}{10} + \frac{7}{10} + \frac{2}{10} = \frac{3+7+2}{10} = \frac{12}{10}$



#### Tips

To add or subtract fractions, there must be a common denominator.

### Addition and Subtraction of Fractions With Different Denominators

**Step 1:** Find the L.C.M. of the denominators.

**Step 2:** Convert all the fractions into like fractions, to make all the denominators equal to L.C.M.

**Step 3:** Add the numerators without changing the denominator.

*Example 1:* Find the sum of  $\frac{1}{4}$ ,  $\frac{3}{8}$ ,  $\frac{4}{10}$

*Solution:*  $\frac{1}{4} + \frac{3}{8} + \frac{4}{10}$

**Step 1.** L.C.M of 4, 8, 10 is 40

**Step 2.**  $\frac{1}{4} \times \frac{10}{10} + \frac{3}{8} \times \frac{5}{5} + \frac{4}{10} \times \frac{4}{4} = \frac{10}{40} + \frac{15}{40} + \frac{16}{40}$   
 $= \frac{10+15+16}{40} = \frac{41}{40}$

Example 2:  $\frac{5}{4} - \frac{3}{8}$

Solution:  $\frac{5}{4} - \frac{3}{8} = \frac{5}{4} \times \frac{2}{2} - \frac{3}{8} \times \frac{1}{1} = \frac{10-3}{8} = \frac{7}{8}$

Example 3: Find the sum of  $\frac{\pi}{3}$  and  $\frac{\pi}{5}$

Solution:  $\frac{\pi}{3} + \frac{\pi}{5} = \left(\frac{\pi}{3}\right)\left(\frac{5}{5}\right) + \left(\frac{\pi}{5}\right)\left(\frac{3}{3}\right) \Rightarrow \frac{5\pi}{15} + \frac{3\pi}{15} \Rightarrow \frac{8\pi}{15}$

**Tips**

If two fractions do not have a common denominator, find the LCM. Then change each fraction to a like fraction with the new denominator as LCM and then add or subtract the numerators without changing the denominator.

**Multiplication of two Fractions**

- If  $\frac{a}{b}$  and  $\frac{c}{d}$  are two fractions, the product  $\frac{a \times c}{b \times d}$  is also a fraction.

Example: (a)  $\frac{5}{4} \times \frac{2}{3} \times \frac{10}{12}$

(b)  $\frac{10}{8} \times \frac{(-2)}{3} = \frac{-20}{24}$

- If  $\frac{a}{b}$  is a fraction,  $1 \times \frac{a}{b} = \frac{a}{b} \times 1 = \frac{a}{b}$ .
- If  $\frac{a}{b}$  is a fraction,  $0 \times \frac{a}{b} = \frac{a}{b} \times 0 = 0$ .

**Division of Two Fractions**

- To divide  $\frac{a}{b}$  by  $\frac{c}{d}$ , multiply  $\frac{a}{b}$  by the multiplicative inverse of  $\frac{c}{d}$  which is  $\frac{d}{c}$ .

$$\therefore \frac{a}{b} \div \frac{c}{d} = \frac{a}{b} \times \frac{d}{c} = \frac{ad}{bc}$$

Example:  $\frac{12}{15} \div \frac{3}{10} = \frac{12}{15} \times \frac{10}{3} = \frac{120}{45} = \frac{24}{9} = \frac{8}{3}$

Example:  $\frac{2}{\sqrt{5}} \div \frac{3}{\sqrt{3}} = \frac{2}{\sqrt{5}} \times \frac{\sqrt{3}}{3} = \frac{2\sqrt{3}}{3\sqrt{2}}$

**Tips**

The reciprocal of a fraction need not be a fraction.

**Exp:** The reciprocal of  $\frac{1}{2}$  is 2.

**Adding Two Mixed Fractions With the Same Denominator**

**Step 1:** Add the whole number parts of all the given mixed fractions.

**Step 2:** Add the fractional parts of the mixed fractions.

**Step 3:** If the resultant fraction is improper, i.e., the numerator is greater than the denominator, then convert it into a mixed fraction.

**Step 4:** Add the result of step 1 to the result of step 3.

Example:  $5\frac{3}{4} + 4\frac{3}{4}$

**Step 1:** Add the whole number parts of the two mixed fractions:  $5 + 4 = 9$ .

**Step 2:** Add the fractional parts of the mixed fractions by adding the numerators of the two fractions, ensuring that the denominators are the same.

$$\frac{3}{4} + \frac{3}{4} \Rightarrow \frac{6}{4} = \frac{3}{2}$$

**Step 4:**  $5\frac{3}{4} + 4\frac{3}{4} = 9\frac{3}{2}$

Following the steps 1, 2 and 4, we get  $9\frac{3}{2} = 9 + 1\frac{1}{2} = 10\frac{1}{2}$

**Step 3:** Since  $\frac{3}{2}$  is improper, convert it into a mixed fraction.

$$\frac{3}{2} = 1\frac{1}{2}$$



**Tips**

Sum of two mixed fractions need not be a mixed fraction.

**Exp:**  $= 1\frac{1}{2} + 9\frac{3}{2} = 12$

### Subtracting Two Mixed Fractions With a Common Denominator

**Step 1:** Subtract the whole number part of the second fraction from the whole number part of the first fraction.

**Step 2:** Subtract the fractional part of the second fraction from the fractional part of the first fraction.

**Step 3:** If the resultant fraction is improper, then convert it into a mixed fraction.

**Step 4:** Add the result of step 1 to the result of step 2 or step 3.

*Example:*  $7\frac{3}{5} - 4\frac{2}{5}$

**Step 1:**  $7 - 4 = 3$

**Step 2:**  $\frac{3}{5} - \frac{2}{5} = \frac{1}{5}$

**Step 4:**  $7\frac{3}{5} - 4\frac{2}{5} = 3\frac{1}{5}$

Thus, the final fraction is  $3\frac{1}{5}$

### Converting Mixed Fractions into Ordinary Fractions

A mixed fraction  $x\frac{y}{z}$  (where  $x$  is the whole number part and  $\frac{y}{z}$  is the fractional part) when converted into an ordinary fraction, it becomes  $\frac{(xz + y)}{z}$ .

*Example:*  $5\frac{3}{2} = \frac{(5 \times 2) + 3}{2} = \frac{13}{2}$



**Tips**

Fractions that have an absolute value greater than 1 can be written either as the sum of an integer and a fraction (a mixed number) or as a single fraction (an improper fraction).

Example: If  $\frac{a}{b} > 1$

**Column A**

$b$

**Column B**

$a$

- (A) Quantity A is greater.
- (B) Quantity B is greater.
- (C) The two quantities are equal.
- (D) The relationship cannot be established.

Solution: Given  $\frac{a}{b} > 1$

If  $a = 4$  and  $b = 2 \Rightarrow \frac{a}{b} > 1 \Rightarrow \text{Column B} > \text{Column A}$

If  $a = -4$  and  $b = -2 \Rightarrow \frac{a}{b} > 1 \Rightarrow \text{Column B} < \text{Column A}$

Since, the columns cannot be uniquely compared. Hence, the correct answer is D.

## Decimals

Fractions can also be written in the form of a decimal. To obtain a decimal from a fraction, divide the numerator by the denominator.

Example:  $\frac{1}{10} = 1 \div 10 = 0.1$ .

Whole Number Part      Decimal Point      Decimal Part

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In the GRE® the questions on decimals are mostly tested in four different areas, they are:

1. Relations between decimals and fractions.
2. The nature of decimals (types of decimals).
3. Place value after the decimal point.
4. Rounding off the decimals.

**There are two types of decimals:**

Terminating and non-terminating decimals.

Non-terminating decimals, in turn, are of two types:

(1) Recurring, and (2) Non-recurring (irrationals).

**Terminating Decimals:** A decimal with a finite number of digits after the decimal point is a terminating decimal.

Example: (A)  $\frac{1}{4} = 0.25$       (B)  $\frac{3}{4} = 0.75$       (C)  $\frac{1}{5} = 0.2$



### Tips

A non-terminating, non-recurring decimal is called an irrational number.

Example:  $\sqrt{2}, \pi$

**Non-terminating Decimals:** When the number of digits after the decimal point is infinite, then the number is called a non-terminating decimal.

**Note:** If the number of digits after the decimal point occurs repeatedly, the number is called a recurring decimal, else it is a non-recurring decimal.

$$(A) \frac{1}{3} = 0.333\dots = 0.\bar{3} \qquad (B) \frac{2}{3} = 0.666\dots = 0.\bar{6}$$

$$(C) \frac{1}{9} = 0.111\dots = 0.\bar{1} \qquad (D) \frac{1}{22} = 0.045454545\dots = 0.04\bar{5}$$

In a decimal, if there is no whole number to the left of the decimal point, then, it is assumed that the whole number is '0'.

*Example:* (A)  $.15 = 0.15$

$$(B) \frac{1}{100} = .01 = 0.01 \text{ and } \frac{1}{1000} = .001 = 0.001$$

$$(C) \frac{99}{1000} = .099 = 0.099$$

### Converting an Infinitely Repeating Decimal Into a Fraction

*Example:*

$$0.\bar{23}$$

Let

$$x = 0.\bar{23} = 0.2323\dots \qquad (1)$$

Then  $100x = 23.2323\dots$

(2)

Subtract Equation (1) from Equation (2), we get

$$100x - x = 23.2323\dots - 0.2323\dots$$

$$99x = 23$$

$$\therefore x = \frac{23}{99}$$

Hence,  $100x - x = (23.2323\dots) - (0.2323\dots)$

### Certain Fractions and Their Decimals to Remember:

$$\frac{1}{4} = 0.25, \quad \frac{1}{2} = 0.5, \quad \frac{3}{4} = 0.75, \quad \frac{1}{3} = 0.33\dots, \quad \frac{2}{3} = 0.66\dots$$

$$\frac{1}{8} = 0.125, \quad \frac{3}{8} = 0.375, \quad \frac{5}{8} = 0.625, \quad \frac{7}{8} = 0.875, \quad \frac{1}{9} = 0.111\dots, \quad \frac{2}{9} = 0.222\dots$$

**Scientific Notation:** A number can also be written as the first digit followed by a decimal, followed by the remaining digits, multiplied by 10 raised to the appropriate power. This representation is called the **scientific notation**.

*Example:*  $5498 = 5.468 \times 10^3$   
 $0.00012 = 1.2 \times 10^{-4}$



#### Tips

When a decimal is divided by another decimal, the result is NOT always a decimal.

**Exp:**  $\frac{4.2}{2.1} = 2$

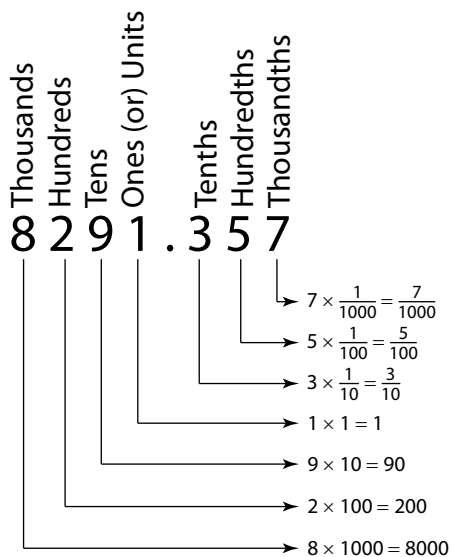


#### Tips

Scientific notation is the shortest way of representing a large number.

**Place Value After the Decimal Point:** In decimal numbers, the position of the decimal point (period) determines the place value of the digits.

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### Conversion of fractions into decimals

Example: (A)  $\frac{9}{2} = 4.5$

(B)  $6\frac{1}{10} = 6 + \frac{1}{10} = 6 + 0.1 = 6.1$

(C)  $\frac{159}{30} = 5\frac{9}{30} = 5 + \frac{3}{10} = 5.3$

### Conversion of decimals into fractions or mixed fractions

Example: (A)  $9.5 = 9 + \frac{5}{10} = 9 + \frac{1}{2} = 9\frac{1}{2}$

(B)  $22.94 = 22 + \frac{94}{100} = 22 + \frac{47}{50} = 22\frac{47}{50}$

(C)  $9.375 = 9 + \frac{375}{1000} = 9 + \frac{3}{8} = 9\frac{3}{8}$

(D)  $0.1 = \frac{1}{10}$

## Ratios and Proportions

A **ratio** is a comparison of two or more similar quantities or numbers. If  $x$  and  $y$  are two positive quantities, then the ratio of  $x$  and  $y$  is given as  $x$  to  $y$ ,  $x$  is to  $y$  or  $x : y$ .

**Inverse Ratio:** If  $a$  and  $b$  are positive integers greater than 1,  $b : a$  is called the inverse ratio of  $a : b$ .



### Tips

In the mixed fraction  $\frac{p}{q}$ , the numerator  $p$  is always greater than the denominator  $q$ .

If the order of the terms in a ratio is changed, the value of the ratio will also change.

That is  $a : b \neq b : a$  (unless both the terms are equal).



### Tips

A ratio has no units. When both the quantities of a ratio are multiplied or divided by the same positive number other than zero, the ratio remains the same.

**Difference Between Ratio and a Fraction:** The ratio of two numbers is a part-to-part relationship but a fraction of two numbers is a part-to-whole relationship.

That is if a quantity of  $x$  units is split into two parts  $a$  and  $b$ , it is represented as the ratio  $a : b$ , then  $x = ak + bk$  (where  $k$  is a positive integer).

*For example*, if a tin contains 20 liters of HCl, in which hydrogen (H) is 8 liters and chlorine (Cl) is 12 liters, this can be expressed as

$$\text{H} : \text{Cl} = 8 : 12 = 2 : 3.$$

$$\text{That is} \quad 20 = 2(4) + 3(4) \quad \begin{cases} 2k + 3k = 20 \\ 5k = 20 \\ k = 4 \end{cases}$$

Whereas, if a quantity of  $x$  units is split into two parts  $a$  and  $b$ , then a fraction  $\frac{a}{x}$  represents 'a' parts of a whole ( $x$ ) and  $\frac{b}{x}$  represents 'b' parts of a whole ( $x$ ).

*For example*, if a tin contains 20 liters of HCl, in which hydrogen (H) is 8 liters and chlorine (Cl) is 12 liters, then the fraction of hydrogen (H) in the tin is  $\frac{8}{20}$  and chlorine (Cl) is  $\frac{12}{20}$ .

*Example 1:* A class consists of 91 students.  $\frac{3}{7}$  of the students are boys. Find the number of girls in the class.

*Solution:* Given the fraction of boys =  $\frac{3}{7}$   
 $\therefore$  the fraction of girls =  $\frac{4}{7}$

Let  $x$  be the number of girls in the class, then  $\frac{x}{91}$  is the fraction of girls in the class.

$$\therefore \quad \frac{4}{7} = \frac{x}{91} \Rightarrow x = 52$$

*Example 2:* The ratio of international sales to national sales is 4:7. What is the contribution towards international sales, if the total sales is \$220?

*Solution:*  $\frac{4}{7+4} = \frac{x}{220} \Rightarrow \frac{220}{11} = \frac{x}{4} \Rightarrow x = 80$

*Example 3:* In a class there are 200 students, of which 155 are girls. How many girls should join the class so that 80% of the students are girls?

*Solution:* Let  $x$  be the number of girls, then  $\frac{155+x}{200+x} = \frac{8}{10} \Rightarrow 1550 + 10x = 1600 + 8x \Rightarrow 2x = 50 \Rightarrow x = 25$

*Example 4:* The ratio of the salaries of Tom and Mike is  $\frac{1}{4} : \frac{1}{3}$ . If the salary of Mike is \$2000 more than the salary of Tom, then find the sum of their salaries.



### Tips

**Note:** The equivalent ratio of  $\frac{1}{a} : \frac{1}{b}$  is  $b : a$ .

**Solution:** The ratio of the salaries of Tom and Mike =  $T : M = \frac{1}{4} : \frac{1}{3}$

$$= \frac{1}{4} \times 12 : \frac{1}{3} \times 12 = 3 : 4$$

where 12 is the LCM of 4 and 3.

Let the salary of Tom (T) =  $3K$   
and the salary of Mike (M) =  $4K$

That is

$$\begin{aligned} M &= \$2000 + T \\ 4K &= 2000 + 3k \\ \Rightarrow 4k - 3k &= 2000 \\ \Rightarrow k &= 2000 \end{aligned}$$

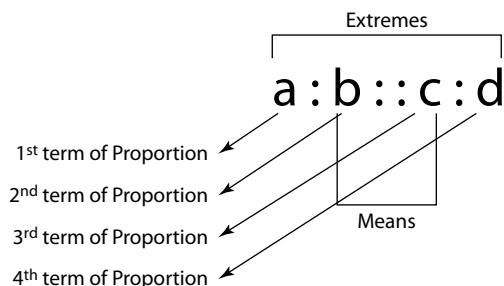
Hence, the sum of their salaries =  $3K + 4K = 7k = 7 \times 2000 = \$14000$

### Proportion

The equality of two ratios is called a proportion and is denoted by ‘ $::$ ’ read as ‘**is as**’

If  $a : b :: c : d$ , then  $a, b, c$  and  $d$  are said to be in proportion.

$$a : b :: c : d \Rightarrow a : b = c : d \Rightarrow \frac{a}{b} = \frac{c}{d} \Rightarrow ad = bc$$



**Tips**

The product of the extremes is equal to the product of the means.

For the ratios to be equal, they need not be of the same units.

The concept of proportion is used to solve problems involving ratios. When one of the four numbers in a proportion is unknown, the unknown value is found by cross multiplying the ratios in the proportion.

**Example:** If the ratio of  $p$  to 24 is the same as the ratio of 5 to 40, find the value of  $p$ .

**Solution:**  $\frac{p}{24} = \frac{5}{40}$ ; By cross multiplication, we get

$$\begin{aligned} p \times 40 &= 5 \times 24, \\ \Rightarrow 40p &= 120 \\ \Rightarrow p &= 3 \end{aligned}$$

if $a : b = b : c$ , then $a, b$ and $c$ , are said to be in proportion	
$a : b = b : c$	3rd Proportion $\Rightarrow b \times b = a \times c$ $\Rightarrow b^2 = ac \Rightarrow b = \sqrt{ac}$
Mean Proportion	



*Example:* Find the mean proportion of 12 and 27.

*Solution:* Assume that the mean proportion of 12 and 27 is  $b$ .

Then 12,  $b$ , and 27 are in proportion.

Since  $b^2 = ac$ ;  $b^2 = 2 \times 27 = 324$

$$\therefore b = \sqrt{324} \Rightarrow b = 18$$

*Example:* Find the 3<sup>rd</sup> proportion of 16 and 64.

*Solution:* Let the 3<sup>rd</sup> proportion of 16 and 64 be  $n$ .

16, 64, and  $n$  are in proportion

$$\Rightarrow b^2 = ac \Rightarrow 64^2 = 16 \times n$$

$$\Rightarrow n = \frac{64 \times 64}{16} = 256$$

Then, the third proportion of 16 and 64 is 256.

*Example:* Find the 4<sup>th</sup> proportion of 7, 11, and 21.

*Solution:* Let the 4<sup>th</sup> proportion of 7, 11, and 21 be  $k$ .

$$\therefore 7 : 11 = 21 : k$$

$$\Rightarrow 7 \times k = 11 \times 21$$

$$\Rightarrow k = \frac{11 \times 21}{7}$$

$$\therefore k = 33$$

$\therefore$  4<sup>th</sup> proportion of 7, 11, and 21 is 33

### **Practice Questions on Fractions, Decimals, Ratios and Proportions**

- Convert 0.239 into the simplest fractional form.
- Convert  $\frac{13}{40}$  into a decimal form.
- Convert  $6.12 \times 10^{-3}$  into the simplest fractional form.
- Which of the following fractions is/are a terminating decimal(s)?
 

(a) $\frac{16}{225}$	(b) $\frac{21}{144}$	(c) $\frac{21}{28}$	(d) $\frac{35}{169}$	(e) $\frac{24}{147}$	(f) $\frac{19}{256}$	(g) $\frac{36}{900}$
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- Find the fractional form of the recurring decimals
 

(a) $0.12\overline{345}$	(b) $0.8\overline{3}$	(c) $4.6\overline{31}$
--------------------------	-----------------------	------------------------
- $\frac{3}{16} - \frac{5}{8} - \frac{1}{4} = ?$
- $\frac{\frac{8}{16} \times \frac{6}{3} + \frac{22}{44} \times \frac{9}{3}}{2\left(\frac{6}{4} + \frac{1}{4} \times \frac{8}{2}\right)} = ?$
- In a mall with 81 workers, one third of the workers are unskilled. If 18 of the unskilled workers are apprentices, find the ratio of unskilled workers who are not apprentices to the skilled workers?



#### **Tips**

$a : b = 2 : 3$  does not imply  $a = 2$  and  $b = 3$ . It should be considered as  $a = 2k$  and  $b = 3k$ .



#### **Tips**

The decimal form of a rational number is either terminating or repeating.

9. The boys and girls in a seminar hall are in the ratio of 5 : 8. Find the total number of girls in the seminar hall, if the hall consists of 520 students.
10. In a theater, the men and women are in the ratio of 3 : 5, and women and children are in the ratio of 2 : 3. Find the ratio of men to children.
11. A vendor bought 10 liters of milk at \$10 and 20 liters of milk at \$30. In what proportion should he mix water and the total 30 liters of milk to sell each liter of milk at \$1 per liter?
12. Find the mean proportion of 8 and 32.

## Percentages

A percentage is a way of expressing a number as a fraction of 100 (*per centum* means ‘per hundred’ in latin). This can also be called as ‘out of hundred’ or ‘for every hundred’, and it is denoted by a symbol ‘%’

Thus, 15% means 15 out of hundred,

**Decimal to Percent Conversion:** In a decimal, shift the decimal point by two places to its right to get the percentage.

*Example:* (A)  $0.25 = 25\%$  (B)  $1 = 100\%$   
(C)  $0.125 = 12.5\%$  (D)  $1.5 = 150\%$

**Percent to Decimal Conversion:** In a percent, shift the decimal point by two places to its left to get the decimal value.

*Example:* (A)  $37.5\% = 0.375$  (B)  $25\% = 0.25$   
(C)  $0.01\% = 0.0001$  (D)  $2456\% = 24.56$

**Fraction to Percent and Percent to Fraction/Decimal Conversion:** When a fraction is given, multiply it by 100 to get the percentage.

*Example:* Convert  $\frac{1}{2}$  into percent  $= \frac{1}{2} \times 100\% = 50\%$

When a percent is given, divide it by 100 and simplify it to get a fraction or a decimal.

*Example:*  $25\% = \frac{25}{100} = \frac{1}{4}$

### Some Common Fractions to Represented as Percentages

$\frac{1}{2} = 50\%$ ;  $\frac{1}{3} = 33.3\%$ ;  $\frac{2}{3} = 66.7\%$ ,  $\frac{1}{4} = 25\%$ ,  $\frac{3}{4} = 75\%$ ,  $\frac{1}{5} = \frac{2}{10} = 20\%$

$\frac{2}{5} = \frac{4}{10} = 40\%$ ;  $\frac{3}{5} = \frac{6}{10} = 60\%$ ;  $\frac{7}{10} = 70\%$ ,  $\frac{5}{10} = 50\%$ ,  $\frac{4}{5} = \frac{8}{10} = 80\%$ ;  $\frac{9}{10} = 90\%$



#### Tips

On the GRE the application of percentages is tested in various concepts like, percentage change, Profit and loss, successive discount, etc. Most of the questions in data interpretation include percentages.

## Percentage Change

A percentage change is a way of expressing the relative change in the percentages, which may increase or decrease. This is given by a formula.

$$\text{Percentage change} = \left( \frac{|\text{Final value} - \text{Initial value}|}{\text{Initial value}} \right) \times 100\% = \left( \frac{|F - I|}{I} \right) \times 100\%$$

### Percent Increase/Decrease:

$$\text{Percent increase} = \frac{\text{Actual increase}}{\text{Original value}} \times 100\%$$

$$\text{Percent decrease} = \frac{\text{Actual decrease}}{\text{Original value}} \times 100\%$$

$$\text{Percent increase from 10 to 12} = \frac{12 - 10}{10} \times 100 = 20\%$$

$$\text{Percent decrease from 15 to 10} = \frac{15 - 10}{15} \times 100 = 33\frac{1}{3}\%$$

Examples:

S. No.	Initial Value	Final Value	Increases	Decrease	% Increase	% Decrease
1	450	600	150		$\frac{150}{450} \times 100\% = 33\frac{1}{3}\%$	
2	580	700	120		$\frac{120}{580} \times 100\% = 20.7\%$	
3	160	140		20		$\frac{20}{160} \times 100\% = 12\frac{1}{2}\%$
4	1250	775		475		$\frac{475}{1250} \times 100\% = 38\%$
5	320	800	480		$\frac{480}{120} \times 100\% = 150\%$	

**Note:** In a problem involving percentages, assuming a starting value of 100 can be very helpful.

**Example:** A dozen apples cost as much as one pound of mangoes. If the cost of a dozen apples is increased by 50% and the cost of 1 pound of mangoes is decreased by 25%, then what percent of the cost of apples is the cost of mangoes?

**Solution:** Assume that 1 dozen apples cost \$100 and 1 pound mangoes cost \$100  
 Increased cost of apples = \$150  
 Decreased cost of mangoes = \$75

$$\frac{150}{75} \times 100 = 200\%$$

Hence, the cost of apples is 200% the cost of mangoes



### Tips

#### Note:

1. If A is  $x\%$  more than B, then B is

$$\left[ \frac{x}{100 + x} \times 100 \right] \% \text{ less than A.}$$

2. If A is  $x\%$  less than B, then B is

$$\left[ \frac{x}{100 - x} \times 100 \right] \% \text{ less than A.}$$

**Points to Remember in Percentages:**

1.  $a\%$  of  $b = \frac{a}{100} \times b = \frac{ab}{100}$
2.  $b\%$  of  $a = \frac{b}{100} \times a = \frac{ba}{100} = \frac{ab}{100}$   
 $\therefore a\%$  of  $b = b\%$  of  $a$
3. If  $a < b$ , the percent increase from 'a' to 'b' will always be greater than the percent decrease from 'b' to 'a'.
4. To increase a number by  $x\%$ , multiply the number by  $\left(1 + \frac{x}{100}\right)$ .
5. To decrease a number by  $x\%$ , multiply the number by  $\left(1 - \frac{x}{100}\right)$ .
6. A decrease of  $x\%$  followed by a decrease of  $y\%$  will always be less than a decrease of  $(x + y)\%$ .
7. An increase of  $x\%$  followed by an increase of  $y\%$  will always be greater than an increase of  $(x + y)\%$ .

**Cost Price (C.P.):** The price paid by a merchant for purchasing a product is termed cost price.

**Selling Price (S.P.):** The price at which a product is sold by the merchant is called selling price.

**Marked Price/Listed Price (M.P.):** The price that is listed on the product is called marked price.

**Profit and Loss:** Profit or loss is the difference between the selling price (S.P.) and the cost price (C.P.)

$$\text{S.P.} - \text{C.P.} = \text{Profit or Loss}$$

If  $\text{S.P.} > \text{C.P.}$ , then the merchant makes a profit.

If  $\text{S.P.} < \text{C.P.}$ , then the merchant makes a loss.

**Note:** Profit and loss percentages are always expressed as a percent of the cost price (unless specified).

$$\text{Profit}\% = \frac{\text{Profit}}{\text{Cost price}} \times 100$$

$$\text{Loss}\% = \frac{\text{Loss}}{\text{Cost price}} \times 100$$

**Discount:** Discount is the percent that a consumer saves, with respect to marked price.

**Profit and loss formulae**

1. Profit or Gain =  $\text{S.P.} - \text{C.P.}$  (It is profit when S.P. is greater than C.P.)
2. Loss =  $\text{C.P.} - \text{S.P.}$  (It is loss only when C.P. is greater than S.P.)
3. Profit % =  $(\text{Actual Profit} \div \text{C.P.}) \times 100\%$
4. Loss % =  $(\text{Actual loss} \div \text{C.P.}) \times 100\%$
5. Actual Discount =  $\text{M.P.} - \text{S.P.}$
6. Discount% =  $(\text{Actual Discount} \div \text{M.P.}) \times 100\%$
7.  $\text{S.P.} = \text{M.P.} - \text{Actual Discount}$

**Tips**

If a number 'n' is increased by  $x\%$  and then decreased by  $x\%$  (or) if 'n' is decreased by  $x\%$  and then increased by  $x\%$ , the result in both the cases will be the same and will always be less than 'n'.

**Tips**

The selling price can also be defined as the positive difference between the marked price and the discounted price.

Example:

S. No	C.P (in \$)	S.P (in \$)	Profit (in \$)	Loss (in \$)	Profit %	Loss %
1	500	575	75	–	$\frac{75}{500} \times 100\% = 15\%$	
2	1200	1344	144	–	$\frac{144}{1200} \times 100\% = 12\%$	
3	700	640	–	60		$\frac{60}{700} \times 100\% = 8\frac{4}{7}\%$
4	1500	1200	–	300		$\frac{300}{1500} \times 100\% = 20\%$

**Successive Discounts:** Discount offered on the discounted price of the marked price is called as successive discount.

In problems involving successive discounts, find the price after the first discount and then the price after the second discount and so on.

Successive discounts can also be calculated as follows:

Net Selling Price =  $MP(1 - x\%)(1 - y\%)$

$$= MP \left( 1 - \frac{x}{100} \right) \left( 1 - \frac{y}{100} \right)$$

where MP: Marked Price

$x$ : First discount

$y$ : Second discount



**Tips**

**Successive discounts:** Two or more discounts offered one after another.

**Formula for Successive Discounts:** Two successive discounts  $x\%$  and  $y\%$  can be represented in a single discount

formula by  $\left( x + y - \frac{xy}{100} \right)\%$

*Example:* If a product worth \$100 is discounted by 30% and 10% successively, then the total discount percentage is ...

*Solution:* Price after first discount:  $100 \times \frac{70}{100} = 70$

Price after second discount:  $70 \times \frac{90}{100} = 63$

$$\therefore 100 - 63 = 37 \text{ i.e., } \frac{37}{100} = 37\%$$

$\therefore$  The total discount is 37 %

(OR)

$$\begin{aligned} \text{Single discount} &= \left( 30 + 10 - \frac{30 \times 10}{100} \right)\% \\ &= (40 - 3)\% = 37\% \end{aligned}$$

**Example:** If a television worth \$900 is discounted by 10%, and then by 20%, what is the final price of the television?

**Solution:** Assume that the price of the television is \$100

Price after the first discount = \$90

Price after the second discount = \$72

∴ The final price of the television after two successive discounts =  $\frac{72}{100} \times 900 = \$648$

(OR)

The final price =  $900 \left(1 - \frac{10}{100}\right) \left(1 - \frac{20}{100}\right) = 900 \times \frac{9}{10} \times \frac{8}{10} = \$648$

**Example:** The price of an article A is increased from \$30 to \$50, The price of an article B is decreased from \$50 to \$30.

#### Column A

The percentage change in the price of article A

#### Column B

The percentage change in the price of article B

**Solution:** Percentage change =  $\left(\frac{|F - I|}{I}\right) \times 100\%$

Column A:  $\left(\frac{50 - 30}{30}\right) \times 100\% = 66\frac{2}{3}\%$

Column B:  $\left(\frac{|30 - 50|}{50}\right) \times 100\% = 40\%$

**Example:** Mike sold two note books for \$1000 each. On one he made a profit of 20% and a loss of 20% on the other. What is Mike's profit or loss?

**Solution:** Let C.P<sub>1</sub> and C.P<sub>2</sub> be the cost price of note book 1 and 2 respectively. S.P<sub>1</sub> and S.P<sub>2</sub> be the selling price of note book 1 and 2 respectively. Since S.P - C.P = profit or loss

∴ C.P <sub>1</sub> + profit = \$1000	∴ C.P <sub>2</sub> - loss = \$1000
⇒ S.P <sub>1</sub> = C.P <sub>1</sub> $\left(1 + \frac{20}{100}\right) = 1000$	⇒ S.P <sub>2</sub> = C.P <sub>2</sub> $\left(1 - \frac{20}{100}\right) = 1000$
∴ C.P <sub>1</sub> = 834 (approx)	∴ C.P <sub>2</sub> = 1250

∴ C.P<sub>1</sub> + C.P<sub>2</sub> = 834 + 1250 = \$2084

∴ S.P<sub>1</sub> + S.P<sub>2</sub> = \$2000

Hence, the difference \$ 84 is the loss made by Mike.



#### Tips

Discount is always calculated on the marked price.



#### Tips

To increase a number by  $x\%$ , multiply the number by  $\left(1 + \frac{X}{100}\right)$ .

To decrease a number by  $x\%$ , multiply the number by  $\left(1 - \frac{X}{100}\right)$ .

## Interest

Interest is the amount earned on money deposited or the amount paid on money borrowed. Interest is usually calculated as a percentage of the principal. There are two different kinds of interests: Simple interest (S.I) and Compound interest (C.I).

**Simple Interest:** The Simple interest is calculated only on the initial principal amount.

$$\text{Simple interest (S.I)} = P \times R\% \times T$$

$$S.I = \frac{PTR}{100}$$

where  $P$  = Principal,

$R$  = Rate of interest per annum, and

$T$  = Time interval (in years).

The total amount with a simple interest (S.I) at the end of ' $T$ ' years is defined as 'amount (A)'.

$$A = P + S.I$$

Simple interest is directly proportional to principal, time and rate of interest, while the amount is proportional only to the principal for the next period.

**Compound Interest:** In the case of compound interest, the unpaid interest is also added to the principal, and the resultant amount becomes the new principal.

$$C.I = P \left[ 1 + \frac{r}{100} \right]^t - P$$

where  $t$  = Number of time intervals,

$r$  = Rate per time interval, and

$P$  = Principal.

*Example:* For the principal amount \$2,000 @ 10% rate of interest compounded annually, the interest for the first year = \$200. The principal amount for the second year will now be = \$2,200.

Hence, the interest for the second year = \$220 [calculated on the new principal of \$2,200].

∴ The total interest = interest for the first year + interest for the second year

$$= \$200 + \$220 = \$420$$

$$\text{whereas the simple interest for 2 years} = \frac{2000 \times 2 \times 10}{100} = \$400$$



### Tips

Compound interest is neither proportional to the principal nor to the rate of interest.

So, the difference between the compound interest and the simple interest for 2 years = \$20

**Note:** This difference in the interest can also be calculated by finding the interest on the simple interest of \$200 for the second year.

$$\text{Hence, simple interest on } \$200 \text{ at } 10\% = \frac{200 \times 10}{100} = \$20$$

### Practice Problems on Percentages:

- 650 is what percent greater than 250?
- If  $x$  is 800% greater than 800, the value of  $x$  = \_\_\_\_\_
- (a) 12% of 10 = 10% of  $x$ , then  $x$  = \_\_\_\_\_  
(b) 10% of 120 is 10 greater than 20% of  $x$ , then  $x$  = \_\_\_\_\_
- 10% of 20% of 30% of 100 = \_\_\_\_\_ %



### Tips

The difference between simple interest and compound interest after two years is equal to the simple interest calculated on the simple interest after the first year.

5. The price of a stole is increased by 10% and then decreased by 20%, it is further increased by 10%.

**Col A**

Original price of the stole

**Col B**

The new price of the stole

6. The cost price of the shrug is \$50. If the price of the shrug is decreased by 60%, now by what percentage should the new price be increased to retain the price of the shrug to its original price?
7. Bill sold an article at 10% profit, if he had sold the article for 5% more, he would have made a profit of \$20 more, find the cost price of the article.
8. After giving a discount of 20%, the retailer made a profit of 10% on the cost of the item. What is the cost price of the item, if the marked price of the article is \$500?
9. If Jack borrowed \$500 for 3 years at 10% interest calculated annually, how much interest would Jack have to pay at the end of 3 years?
10. If Mike borrowed \$500 for 3 years at 10% annual interest, compounded quarterly, how much interest would Mike have to pay at the end of 3 years?

**Tips**

- 10% of  $k = \left(\frac{10}{100}\right) \times k = \frac{10k}{100}$
- $x$  is 10 greater than 3 times of  $y$ , means  $x = 3y + 10$  similarly,  $x$  is 10 less than 3 times of  $y$ , means  $x = 3y - 10$ .

## PRACTICE EXERCISES

### Exercise No. 1

**Directions:** Select all the options that are correct as per the information given in each question. Remember that one or more options may be correct.

- |  |   |
|--|---|
| <p>1. Which of the following numbers are divisible by 72? (Mark <u>all</u> the correct answers)</p> <p>(A) 132300                      (E) 1995840</p> <p>(B) 313344                      (F) 7432164</p> <p>(C) 430560                      (G) 9434272</p> <p>(D) 728972</p>   | <p>(A) <math>\frac{30}{196}</math>                              (F) <math>\frac{89}{625}</math></p> <p>(B) <math>\frac{32}{225}</math>                              (G) <math>\frac{78}{1024}</math></p> <p>(C) <math>\frac{72}{3000}</math>                              (H) <math>\frac{20}{189}</math></p> <p>(D) <math>\frac{25}{144}</math>                              (I) <math>\frac{77}{222}</math></p> <p>(E) <math>\frac{57}{128}</math></p>    |
| <p>2. If 'x' is an even integer and 'y' is an odd integer, then which of the following must be even? (Mark <u>all</u> the correct answers)</p> <p>(A) <math>x^2 + 2^y</math>                      (E) <math>x + xy</math></p> <p>(B) <math>(x + y)^2</math>                      (F) <math>\frac{4x^2 + 2y^2}{2}</math></p> <p>(C) <math>x^2 - y^2</math>                      (G) <math>2x^2 + 4xy + y^2</math></p> <p>(D) <math>x^y</math></p> | <p>4. When a positive integer is divided by 5, the remainder is 2 and when it is divided by 7, the remainder is 1. What could be the possible values of positive integer? (Mark <u>all</u> the correct answers)</p> <p>(A) 17                                      (E) 52</p> <p>(B) 22                                      (F) 57</p> <p>(C) 26                                      (G) 62</p> <p>(D) 37                                      (H) 92</p> |
| <p>3. Which of the following fractions are terminating decimals? (Mark <u>all</u> the correct answers)</p>   |   |



5. Which of the following pairs are not reciprocals of each other? (Mark all the correct answers)
- (A)  $\sqrt{5} - 2$  and  $(\sqrt{5} - 2)^{-1}$   
 (B)  $7^{-1}$  and  $-7^{-1}$   
 (C) 13 and  $13^{-1}$   
 (D)  $\sqrt{3} - \sqrt{2}$  and  $\sqrt{3} + \sqrt{2}$   
 (E)  $\sqrt{a}$  and  $\frac{\sqrt{a}}{a}$   
 (F) 2 and  $-2$   
 (G)  $\sqrt{7} + 7$  and  $(-\sqrt{7} + 7)$
6. Which of the following digits cannot be in the units place when a non-zero integer is squared? (Mark all the correct answers)
- (A) 1 (D) 7  
 (B) 2 (E) 8  
 (C) 3 (F) 9
7. What could be the values of  $x + y$ , in the 8 digit number 8 8 7 9 8 0  $x$   $y$ , if the number is divisible by both 3 and 8? (Mark all the correct answers)
- (A) 2 (E) 9  
 (B) 5 (F) 10  
 (C) 7 (G) 11  
 (D) 8 (H) 14
8. If ' $m$ ' is the highest common factor of 24 and 36, then ' $m$ ' must be the highest common factor of 24 and which of the following integers? (Mark all the correct answers)
- (A) 12 (E) 72  
 (B) 24 (F) 84  
 (C) 48 (G) 96  
 (D) 60 (H) 120
9. If ' $x$ ' is a positive integer, which of the following can be the greatest common divisor of 7 and  $x$ ? (Mark all the correct answers)
- (A) 1 (E)  $x - 7$   
 (B) 7 (F)  $x + 7$   
 (C)  $x$  (G)  $7x$   
 (D)  $7 - x$  (H)  $2x + 7$
10. The length of ' $n$ ' is defined as the number of prime factors of ' $n$ '. Which of the following numbers has a length 4? (Mark all the correct answers)
- (A) 4 (E) 128  
 (B) 36 (F) 200  
 (C) 60 (G) 210  
 (D) 70 (H) 243

## Exercise No. 2

*Directions: Select the correct option from the choices that follow each question.*

1. If ' $a$ ' is even and ' $b$ ' is an integer, then which of the following numbers must be even?
- (A)  $2a^2 + b$  (E)  $(a + b)^2 - (a - b)^2$   
 (B)  $ab^2 + 4$  (F)  $\frac{a^2 + 4b}{4}$   
 (C)  $(a + b)(a - b)$  (G)  $b$ , where  $a < b$   
 (D)  $7ab + 4b^2$
2. Which of the following can be the number of days in ' $x$ ' weeks, where ' $x$ ' is an integer?
- (A) 2,911,272 (D) 1,309,851  
 (B) 2,272,911 (E) 1,234,567  
 (C) 1,851,369
3. A vendor bought two pre-owned cars for \$5000 and sold them for a profit of \$1820. He made a profit of 28% on one car and 42% on the other car. What is the cost price of the car on which he made a profit of 28%?
- (A) \$1000 (D) \$4000  
 (B) \$2000 (E) \$5000  
 (C) \$3000

4. Which of the following is the approximate value of half of the square root of  $\frac{50.12 \times 0.4981}{199.8213...}$ ?
- (A)  $\frac{1}{8\sqrt{2}}$  (D)  $\frac{1}{\sqrt{2}}$   
 (B)  $\frac{1}{4\sqrt{2}}$  (E)  $\sqrt{2}$   
 (C)  $\frac{1}{2\sqrt{2}}$
5. If  $a, b, c$ , are positive and odd integers, and  $d$  is a non-zero integer, then which of the following is not necessarily true?
- (A)  $(abc)^2$  is odd  
 (B)  $a^2 + b^2 + c^2$  is even  
 (C)  $\left(\frac{a^2 + b^2}{2}\right)c^2$  is odd  
 (D)  $7a + ab + 3d$  is odd  
 (E)  $\left(\frac{a^2 + b^2}{2}\right)$  is odd
6. 'K' is the least positive integer that is divisible by all positive integers less than or equal to 10. Find the total number of factors of  $k$  (excluding 1 and 'k').
- (A) 4 (D) 46  
 (B) 6 (E) 48  
 (C) 7
7. Find the approximate square root of
- $$\frac{\left(12\frac{1}{5}\right)^2 - \left(5\frac{1}{12}\right)^4}{\left(12\frac{1}{5}\right)^2 - \left(5\frac{1}{12}\right)^2}$$
- (A) 12 (D) 15  
 (B) 13 (E) 16  
 (C) 14
8. A 9 ft x 4 ft poster covers 18% of a rectangular wall. What is the approximate area of the wall (in sq. feet)?
- (A) 126 (D) 190  
 (B) 156 (E) 200  
 (C) 160
9. Mike and Tom play a time bound snooker game. At the end of the game, Mike scores 70% of the points and Tom scores 80% of the points. The winner gets \$10 for each point he scores more than the loser. If the total points that can be earned in the game is 90, then, how many dollars does the winner get?
- (A) 9 (D) 72  
 (B) 20 (E) 90  
 (C) 63
10. Which of the following has the greatest value?
- (A)  $\sqrt{3} - \sqrt{2}$  (D)  $\sqrt{5} - \sqrt{3}$   
 (B)  $\sqrt{7} - \sqrt{6}$  (E)  $\sqrt{4} - \sqrt{3}$   
 (C)  $\sqrt{6} - \sqrt{5}$

### Exercise No. 3

**Directions:** Write your answer to the given questions in the box(es) provided. Questions with a correct answer in the form of integer or decimal are provided with one box. Questions with a correct answer in the form of fractions have two boxes, one for the numerator and the other for the denominator.

1. Four pipes A, B, C, and D can fill a tank in 3, 6, 9 and 12 days respectively. What is the least portion of tank that can be filled in one day by any three of the pipes working together at their respective rates?


2. In a certain year, a company earns  $\frac{2}{7}$  th of the profit through sale of cars and  $\frac{1}{7}$  th of the profit through sale of trucks. The profit made by sale of all the other vehicles other than cars and trucks in that year was 28 million dollars. What is the revenue generated by the sale of trucks in that year?

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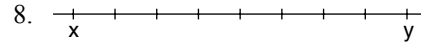
3. Find the four digit-integer,  $ABCD$ , in which  $A$ ,  $B$ ,  $C$  and  $D$  are distinct non-zero numbers,  $A + B + C = D + 1$ ,  $C = A - 1$  and  $B = A - 4$ .

4. If  $(4^x)(16^y) = 2^2 \times 1024$  and  $(27^y)(81^x) = 3^9 \times 243$ , then what is the value of  $x + y$ ?

5. If 'x' is divisible by both 12 and 9, then what is the least possible value of  $x$ ?

6. The sum of all even integers between 1 and 100 is 2550. What is the sum of all the odd integers between 50 and 150?

7. Except for the first two numbers, every number in the set of 90 numbers  $\{-1, 3, 2, \dots\}$  is the sum of two preceding numbers. How many numbers of this set are even?



(Figure drawn to scale)

If  $x = 17$  and  $y = 153$ , then what is the length of each interval?

9. Mr. Jack spends  $\frac{2}{3}$  of retirement fund and saves the rest as a fixed deposit which gives an interest of 10% compounded annually. Minimum, for how many years should he save the amount to get interest greater than his savings.

10. A certain amount is invested for three years at  $x\%$  rate of interest. The amount at the end of 2<sup>nd</sup> and 3<sup>rd</sup> year is \$900 and \$1050, respectively. What is the initial amount?

### Exercise No. 4

**Directions:** Compare Column A with Column B, using additional information if given. Select one of the following four answer choices.

- A. Column A is greater.  
 B. Column B is greater.  
 C. The two columns are equal.  
 D. The relationship cannot be determined from the information given.

1. <b>Column A</b> No. of factors of 80 greater than $\sqrt{80}$	<b>Column B</b> No. of factors of 90 greater than $\sqrt{90}$	3. <b>Column A</b> Remainder when the greatest prime number below 72 is divided by 6	<b>Column B</b> Remainder when the least prime number after 72 is divided by 6
2. <b>Column A</b> Remainder when $3^{8n+3} + 5$ is divided by 10	<b>Column B</b> Remainder when $7^{8n+3} + 5$ is divided by 10	4. <b>Column A</b> 45 <sup>th</sup> decimal value of $\frac{3}{7}$	<b>Column B</b> Ten millionth decimal value of $\frac{3}{7}$

5. A decimal 'd' when rounded to the nearest tenth is 0.5 and a decimal 'e' when rounded to the nearest integer is '1'

**Column A**

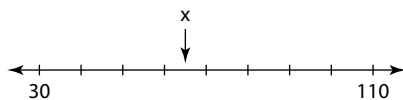
d

**Column B**

e

6. **Column A** 2.5 % of 0.8% of 800  
**Column B** 25 % of 8% of 8

7.



(Figure drawn to scale)

**Column A**

$x - 70$

**Column B**

$110 - x$

8. The following 10 digit number  $765 \times 434215$  is divisible by 9.

**Column A**

x

**Column B**

9

9. **Column A**  $\sqrt{5} - \sqrt{3}$   
**Column B**  $\sqrt{6} - \sqrt{2}$

10. Kevin takes 90 minutes to travel a distance of 24 miles.

**Column A**

The time taken by Kevin to travel a distance of 30 miles at the same speed

**Column B**

120 minutes

### Exercise No. 5

**Directions:** Select the correct option from the choices that follow each question.

1.  $\frac{(20 \div 5)^2 (-2 + 6)^3}{(60 \div 12) - (-7 + 4)} = ?$

- (A) 25 (D) 28  
(B) 26 (E) 210  
(C) 27

2. Find 'x' if  $2^x = x^2$

- (A) 0 (D) 3  
(B) 1 (E) 4  
(C) 2

3. A set is formed by all remainders when the odd numbers between 8 and 800 are divided by 5. What is the mode of the set ?

- (A) 0 (D) 3  
(B) 1 (E) 4  
(C) 2

4. The ratio of number of boys to girls in class A is 3 : 5 and in class B is 5 : 6. If there are 176 students in each class, find the total number of boys in both the classes.

- (A) 66 (D) 176  
(B) 80 (E) 228  
(C) 146

5. The total number of fruits in a basket is 188. The ratio of apples to bananas is 3 : 5 and the ratio of bananas to oranges is 4 : 3. If there are no other fruits in the basket, then how many bananas are there in the basket?

- (A) 36 (D) 80  
(B) 48 (E) 100  
(C) 60

**Directions for Questions 6-10 :** Compare Column A with Column B, using the additional information if given. Select one of the following four answer choices.

- A. Column A is greater.  
B. Column B is greater.  
C. The two columns are equal.  
D. The relationship cannot be determined from the information given.

6. **Column A** Number of factors of 6!  
**Column B** Number of factors of 735

7. In a college of 350 students,  $\frac{3}{7}$ th qualified for a research program.  $\frac{1}{5}$ th of the qualified students attended a seminar along with 120 students from another college.
- |   |  |
|---|--|
| <b>Column A</b>   | <b>Column B</b>                                  |
| The number of graduate students who were qualified for the research program | The number of graduates who attended the seminar |
8. **Column A**                      **Column B**
- |   |   |
|---|---|
| The units place of the number $7^{95} - 3^{58}$ | 4 |
|---|---|
9. An amount of \$10,000 is deposited in a bank
- |   |   |
|---|---|
| <b>Column A</b>   | <b>Column B</b>   |
| Amount earned at a rate of 12% per annum compounded half yearly for 3 years | Amount earned at a rate of 10% per annum, compounded annually for 4 years |
10. A certain amount doubled in 7 years at a rate of R% per annum
- |                 |                      |
|-----------------|----------------------|
| <b>Column A</b> | <b>Column B</b>      |
| 'R'             | 15% rate of interest |

# CHAPTER 18

## Algebra

### Formulae Cheat Sheet

1. **Rules for Exponents:** If  $x$  is a non-zero number and ' $n$ ' is an integer, then an algebraic expression  $x^n$  is read as  $x$  raised to the power of  $n$  (where  $x \rightarrow$  base,  $n \rightarrow$  exponent)

#### Expressions

(a)  $x^a x^b = x^{a+b}$

(b)  $\frac{x^a}{x^b} = x^{a-b}$

(c)  $(xy)^a = x^a \times y^a$

(d)  $\left(\frac{x}{y}\right)^a = \frac{x^a}{y^a}$

(e)  $(x^a)^b = x^{ab}$

(f)  $x^{-a} = \frac{1}{x^a}$

(g)  $x^0 = 1$  ( $x \neq 0$ )

(h)  $\sqrt[n]{x} = x^{1/n}$

(i)  $\sqrt[b]{x^a} = x^{a/b}$

(j) if  $a^m = a^n$  then  $m = n$  ( $a \neq 0, 1$ )

#### Examples

$$2^3 \times 2^4 = 2^{3+4} = 2^7$$

$$\frac{3^5}{3^2} = 3^{5-2} = 3^3 = 27$$

$$(4 \times 5)^2 = 4^2 \times 5^2 = 16 \times 25 = 400$$

$$\left(\frac{4}{2}\right)^4 = 2^4 = 16 \text{ \& } \frac{4^4}{2^4} = \frac{256}{16} = 16$$

$$(3^2)^3 = 3^{2 \times 3} = 3^6 = 729$$

$$3^{-2} = \frac{1}{3^2} = \frac{1}{9}$$

$$2^0 = 1 \text{ (and } 0^0 \text{ is not defined)}$$

$$\sqrt[2]{3} = 3^{1/2}$$

$$\sqrt[2]{3^4} = 3^{4/2} = 3^2 = 9$$

$$2^3 = 2^n \Rightarrow n = 3; (1^7 = 1^{31}, 7 \neq 31)$$

Remember the following pairs of expressions that are commonly mistaken to be identities

**Expressions**

(a)  $x^{-1} \neq -x$

(b)  $x^2 \neq 2x$  and  $y^2 \neq 3y$

(c)  $\frac{x}{(y+z)} \neq \frac{x}{y} + \frac{x}{z}$  but  
 $\frac{(x+y)}{z} = \frac{x}{z} + \frac{y}{z}$

(d)  $(x+y)^m \neq x^m + y^m$

(e)  $(x^n)^m \neq x^n \times x^m$

(f)  $x^n \times y^m \neq (xy)^{m+n}$

**Examples**

$2^{-1} \neq -2$

$3^2 \neq 2(3)$  and  $2^3 \neq 3(2)$

$\frac{2}{(3+4)} \neq \frac{2}{3} + \frac{2}{4}$

$\frac{(2+3)}{4} = \frac{2}{4} + \frac{3}{4}$

$(x+y)^2 \neq x^2 + y^2; (2+3)^2 \neq 2^4 + 3^4$

$(2^3)^4 \neq 2^3 \times 2^4$

$2^3 \times 4^5 \neq (2 \times 4)^{3+5}$

2. **Quadratic formula**  $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$  to find the roots of  $ax^2 + bx + c = 0$ .

Let  $\alpha = \frac{-b + \sqrt{b^2 - 4ac}}{2a}; \beta = \frac{-b - \sqrt{b^2 - 4ac}}{2a}$

Now  $ax^2 + bx + c = 0$  can be written as  $x^2 - (\alpha + \beta)x + (\alpha\beta) = 0$ .

$(\alpha + \beta) = \text{sum of the roots} = \frac{-b}{a}; \alpha\beta = \text{product of the roots} = \frac{c}{a}$ .

3. If  $0 < x < 1$  and  $n$  is a positive Integer,

$$x^n < x^2 < x < \sqrt{x} < \sqrt[n]{x} < x^0 < x^1 < x^{-n}$$

4.  $\frac{a}{b} > 1$  need not imply  $a > b$ .

Example:  $\frac{4}{2} > 1 \Rightarrow 4 > 2$

but  $\frac{-4}{-2} > 1$  doesn't imply  $-4 > -2$

5. If  $a < b$ , the following relations holds true.

S. No.	Quadratic Form	Solution		On Number Line
1.	$(x - a)(x - b) < 0$	$a < x < b$	$x \in (a, b)$	
2.	$(x - a)(x - b) < 0$	$a \leq x \leq b$	$x \in (a, b)$	
3.	$(x - a)(x - b) > 0$	$x < a, x > b$	$x \in (-\infty, a) \cup (b, \infty)$	
4.	$(x - a)(x - b) \geq 0$	$x \leq a, x \geq b$	$x \in (-\infty, a) \cup (b, \infty)$	

6. If  $a_1x + b_1y + c_1 = 0$  &  $a_2x + b_2y + c_2 = 0$ , the conditions for the number of solution is related as follows

S. No.	Condition	Number of Solutions	Type of Equation
1.	$\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$	Unique solution	Consistent
2.	$\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$	Infinite solutions	Consistent
3.	$\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$	No solution (or) zero solution	Inconsistent

7. **Standard Identities of Algebra:** An identity is an equality that is always true for any value used in the equality.

**Certain important identities to remember are:**

$$(a + b)^2 = a^2 + 2ab + b^2$$

$$(a - b)^2 = a^2 - 2ab + b^2$$

$$a^2 - b^2 = (a + b)(a - b)$$

$$(a + b)^3 = a^3 + b^3 + 3ab(a + b) = a^3 + b^3 + 3a^2b + 3ab^2$$

$$(a - b)^3 = a^3 - b^3 - 3ab(a - b) = a^3 - b^3 - 3a^2b + 3ab^2$$

$$a^3 + b^3 = (a + b)(a^2 - ab + b^2)$$

$$a^3 - b^3 = (a - b)(a^2 + ab + b^2)$$

$$(a + b + c)^2 = a^2 + b^2 + c^2 + 2ab + 2bc + 2ca$$

$$a^3 + b^3 + c^3 - 3abc = (a - b)(a^2 + b^2 + c^2 - ab - bc - ca)$$

8. **Algebraic SHOTS:** An algebraic expression is the shortest representation of a mathematical statement that uses letters and/or symbols to represent numerical values.

(1) There are rules to simplify expressions. For example  $A^2A^3$ . In this product, since the first  $A^2$  is (A)(A) and the second  $A^3$  is (A)(A)(A), the result equals (A)(A)(A)(A)(A). In short notation, it can be written as:  $A^2A^3 = A^5$ . This can be generalized as  $A^r A^s = A^{r+s}$ . ( $A \rightarrow$  base;  $(r + s) \rightarrow$  exponent).

(2) The expression  $A^{\frac{1}{2}}$  represents the square root of  $A$ . If  $y = A^{\frac{1}{2}}$ , then  $y^2 = A$ . Similarly,  $B^{\frac{1}{4}}$  is the fourth root of  $B$ .

(4) FOIL—Mnemonic for multiplying two binomials  $(x + y)(x - y)$

(a) F – First Terms:  $x \cdot x$ .

(b) O – Outside Terms:  $x \cdot y$ .

(c) I – Inside Terms:  $y \cdot x$ .

(d) L – Last Terms:  $y \cdot y$ .

9. **Taking a SHOT at the Questions:** Most of the mathematical equations in the exam can be simplified, if one or more of the following suggestions are used.

(1) *Attempt to Illustrate the Problem:* Make a sketch of the problem; very often, the very act of trying to sketch a problem will suggest a method for solving it.



- (2) *Avoid Working with Large Numbers*: Most people slow down while working with large numbers. They find that the routine numerical calculations are tiring and disproportionately time-consuming. Hence, the use of simple calculators is always recommended.

*Example*: Compute  $(26)^2 - (24)^2$

When you use the shortcut method to find the answer, it should not take more than 20 seconds. Therefore, if it takes longer time than normal, it probably means that you are on the wrong path. You can compute the above example by using the conventional method to solve a problem but this involves calculating the squares of 26 and 24 and then calculating the difference. This time-consuming process can be shortened by using the formula:

$$x^2 - y^2 = (x + y)(x - y)$$

Assume  $x = 26$  and  $y = 24$ . Hence,  $x + y = 26 + 24 = 50$ , and  $x - y = 26 - 24 = 2$

$$x^2 - y^2 = (50)(2) = 100$$

$$\therefore 26^2 - 24^2 = 100$$

Some of these identities are useful in geometry, especially when the Pythagoras theorem is needed.

- (3) Whenever possible, simplify equations to permit calculations with integer coefficients.

## Basic Concepts in Algebra

In Mathematics, algebra is widely used to solve critical problems quickly and easily. Arithmetic involves operations that mostly deal with known values (numbers) whereas, algebra involves operations that deal with unknown values (variables), which are usually denoted by the letters of the English alphabet.



### Tips

**Picking good variables:** In algebraic translation, it is advisable to pick the first letter of the noun as the required variable.

**Exp:** Tom is 2 years older than John. That is, the age of Tom is written as  $T = 2 + J$ .

Algebra topics include linear equations, quadratic equations, inequalities, solving for equations and inequalities, operation with exponents and absolute values, and algebraic translations to solve word problems and their applications.

The algebra in the GRE® also includes coordinate geometry which includes equations, inequalities intercepts, slope of lines and graphs of functions.

For convenience, the concepts of coordinate geometry and graphs of functions are discussed after the concepts of geometry, as they deal with the applications of the plane geometry.

**Algebraic Translation:** This is the process of converting the given algebraic data into an equation. That is, the information given is translated into linear equations or a system of linear equations which help in solving an unknown value.

For example, if Monty's age is 10 years more than thrice his son's age...

This information is translated into an equation and written as

$$M = 10 + 3S \quad (M = \text{Monty's age}, S = \text{son's age})$$

The algebraic translation includes the concepts of: 1) Linear equations with one or more than one variable, 2) System of linear equations with one or more than one variable, 3) Solving for one or more variables, and 4) Solving for linear equations, quadratic equations, simultaneous equations, and so on.

**Operations with Algebraic Expressions:** An algebraic expression may have one or more variables and a few constants, the sum of, the product of constants and variables together can be written as a single term or as a sum of terms.

For example,  $5x$  is a single term, and the algebraic expression  $7x^3 + 6x^2 - 5x^2 + 4x + 3$  is called a sum of terms. In the expression  $7x^3 + 6x^2 - 5x^2 + 4x + 3$ , the terms  $6x^2$  and  $-5x^2$  are called like terms, 7, 6, 5, 4, and 3 are constants, in which 7, 6, 5, 4, are called coefficients and 3 is called constant term.

**Tips**

A number that multiplies a variable is called the **coefficient** of a term.

## Equations

An equation is an algebraic statement between two valid mathematical expressions that are joined by the equal sign '=' and this equality is true for only certain values of the variables. These values are called the solutions of the equation.

Therefore, an equation has two sides, the left-hand side and the right-hand side. An equation represents the equality of two expressions involving constants and/or variables.

*Examples:*

Equation	Type of Equation	Degree
$4x + 5 = 17$	A linear equation in one variable ( $x$ )	1
$2x - y = 12$	A linear equation in two variables ( $x$ and $y$ )	1
$4x^2 - 8x - 2 = 0$	A quadratic equation in one variable ( $x$ )	2
$5x^2 - 6y^2 + 2xy + 3 = 0$	A quadratic equation in two variables ( $x$ and $y$ )	2
$X^3 - Y^3 = 0$	A cubic equation in two variables ( $x$ and $y$ )	3
$ax^n + bx^{n-2} + c = 0$	Polynomials in one variable ( $x$ )	$n$

**Linear equation:** A linear equation is a first-degree algebraic equation, where each term is either a constant or a product of a constant and one variable.

Any equation of the first degree with ' $n$ ' variables is called a linear equation with ' $n$ ' variables.

Any equation of the first degree with two variables  $x$  and  $y$  is called a linear equation with two variables.

The general form of a linear equation with two variables is  $ax + by + c = 0$  (' $a$ ' and ' $b$ ' are non-zero real numbers and ' $c$ ' is any real number).

For example,  $y = 2x + 9$  and  $3x + 2y = 6$  are first-degree algebraic equations and hence are called linear equations. A linear equation can be graphically represented as a straight line.

*Example:* A box contains two varieties of Snickers worth \$10. If one variety of Snickers costs \$2 and the other costs \$4, find the possible number of Snickers which cost \$2.

*Solution:* Let  $A$  and  $B$  be the two varieties of Snickers. The total cost of all the Snickers is \$10 i.e.,  $2A + 4B = 10$ . The possible integer values of the ordered pairs  $(A, B)$  that satisfy the above equation are  $(1, 2)$ ,  $(3, 1)$  and  $(5, 0)$  respectively.

Hence,  $A$  could be 1, 3 or 5, but  $A$  can take only 1 and 3 because, it is given that the box contains two varieties of snickers, so the box contains at least one snicker worth \$4.

**Tips**

In general, to solve an equation with  $n$ -unknown variables we need  $n$ -linear equations, but in GRE we may be asked to solve for  $n$ -variables with less than  $n$  equations.

**System of Linear Equations:** The questions on the GRE® that come under algebraic translation at times include a large number of linear equations with  $n$  unknown variables. The ‘ $n$ ’ equations with ‘ $m$ ’ variables are called ‘a system of linear equations’. The questions on linear equations mostly ask to ‘solve for a variable’.

To solve most unknown variables, you can follow quite a few different methods. The most convenient of these are:

1. Modifying the equations.
2. Substitution
  - (a) Substituting one variable from one equation to the other.
  - (b) Work back from the answer choices.

### 1. Modifying/Manipulating the Equations:

*Example:* This method involves manipulating the equation, using the two simultaneous linear equations.

$$3x + 2y = 7 \quad (1)$$

$$2x + y = 9 \quad (2)$$

Multiply the Eq. (2) by  $-2$ , we get  $-4x + (-2y) = -18$

Now the two equations are

$$3x + 2y = 7$$

$$-4x - 2y = -18$$

By simplifying, we get  $x = 11$  and  $y = -13$

**2(a). Substitution:** Consider two equations,  $3x + 2y = 7$  and  $2x + y = 9$ . In general, to solve linear equations with two variables  $x$  and  $y$ , we substitute one variable from any one of the equations in the other equation.

*Example:*  $3x + 2y = 7 \quad (1)$

$$2x + y = 9 \quad (2)$$

*Solution:* Rearrange the second equation to get  $y = 9 - 2x$ , replace ‘ $y$ ’ in the first equation with  $9 - 2x$ :  $3x + 2(9 - 2x) = 7$ . Now, from the simplified equation, we can find  $x$ .

$$3x + 18 - 4x = 7 \Rightarrow x = 11$$

Plug in the value of  $x$  into either of the equations to find  $y$ .

$$3(11) + 2y = 7 \Rightarrow y = -13$$

To ensure that the answer is correct, plug in the values of  $x$  and  $y$  into the other equation  $2(11) + (-13) = 9$ . Hence, the values of  $x$  and  $y$  are 11 and  $-13$  respectively.

*Example:* If  $x + 5y = 16$  and  $x = 3y$ , then  $y = ?$

*Solution:* By substituting the second equation ( $x = 3y$ ) in the first equation

$$x + 5y = 16$$

$$3y + 5y = 16, \text{ we get}$$

This implies  $8y = 16$ . Hence  $y = 2$ .



#### Tips

The ordered pair  $(a, b)$  is different from the ordered pair  $(b, a)$  unless  $a = b$ .



#### Tips

The way to solve for a variable is to use the values given in the answer choices.

**2 (b). Work back**

*Example:* A book seller arranges 300 books into rows. If he arranges 10 more books per each row, he will need 5 rows fewer. How many rows are there in the first arrangement?

- (a) 5                      (b) 10                      (c) 15                      (d) 20                      (e) 25

*Solution:* Working back from the answer choice 'C'

The number of rows in the first arrangement = 15

The number of books in each row =  $\frac{300}{15} = 20$

If each row has 10 more books, then the number of books in each row = 30

Hence, the number of rows in the second arrangement =  $\frac{300}{30} = 10$ ,  
which is 5 rows fewer than the first arrangement

Hence, option C is the correct answer.

**Fundamental Arithmetic Operations of Variables****Addition/Subtraction**

In algebraic translation, the linear equations and system of linear equations mostly involve arithmetic operations such as addition and subtraction. They help in solving questions for which the variables are not known.

For example, in the question if it is given 'John is 6 years older than his brother,...'

the above statement can be translated assuming that the brother's age is  $B$  years, then, John's age is  $(B + 6)$  years.

*Example:* Clara bought 3 books for herself and 5 books for her sister.

If the cost of each book is  $\$x$ , then how much should she pay for all the books?

*Solution:* The total number of books bought =  $3 + 5 = 8$ .

Cost of each book =  $\$x$ .

Cost of the books that Clara bought for herself =  $(3)(x) = 3x$ .

Cost of the books that Clara bought for her sister =  $(5)(x) = 5x$ .

The total cost of the books =  $3x + 5x = \$8x$ .

*Example:* A store sells pens and pencils for  $\$x$  and  $\$y$  respectively. If 16 students purchase pens and 21 students purchase pencils, then what is the total amount paid by the students?

*Solution:* Amount paid for 16 pens =  $16(x) = 16x$ .

Amount paid for 21 pencils =  $21(y) = 21y$ .

The total amount paid for both the pens and the pencils =  $16x + 21y$ .

Since  $x$  and  $y$  represent the pens and the pencils, they cannot be added or subtracted. If the exact values of  $x$  and  $y$  are known, the expression can be evaluated by substituting the values.

*Example:* Cathy bought 50 apples for  $\$x$  each and sold 20 apples at the same price, 20 apples at double the cost price and the rest at 3 times the cost price. She had a net amount of  $\$45$  on selling all the apples. Find the cost price of each apple.

**Tips**

Any equation of the first degree with one variable is called a linear equation in one variable.

*Solution:* The cost of each apple =  $\$x$   
 The cost of 50 apples =  $\$50x$   
 Cathy sold 20 apples at  $\$x$ , 20 apples at  $\$2x$  and 10 apples at  $\$3x$   
 $\therefore$  the total selling price of 50 apples =  $20x + 20(2x) + 10(3x)$   
 $= 90x$

Given the total selling price of 50 apples =  $\$45$

$$\therefore 90x = \$45$$

$$\Rightarrow x = \frac{45}{90} \times 100 \text{ cents } (\$1 = 100 \text{ cents})$$

$$= 50 \text{ cents} = \$0.5$$

$\therefore$  the cost of each apple =  $\$0.5$


**Tips**

The values which validate the equation are called solutions or roots of the equation.

**Practice Questions on Linear Equations:**

1. If  $11x - 4(3 - 2x) = 13x - 5(x - 3)$ , then  $x =$  \_\_\_\_\_
2. If  $5x - 6y = 3$  and  $8x - 9y = 6$  then the ordered pair  $(x, y) =$  \_\_\_\_\_
3. If  $13x + 11y = 59$ ;  $7x + 15y = 59$ , find the value of  $x + y$ .
4. A merchant bought a box of 10 apples and 20 peaches for  $\$40$  and he bought one more box of 8 apples and 10 peaches for  $\$26$ . If the cost of an apple and a peach in both the boxes is the same, find the cost of each apple and each peach.
5. If  $x$  is an integer which is 7 greater than 4 times an integer  $y$ , and 2 times the integer  $x$  is 1 less than thrice the integer  $y$ , then find the values of  $x$ .

Although questions involving three linear equations appear rarely on the GRE®, it is safe to be familiar with the methods of solving them.

*Example:* If  $2x + y - 3z = 3$ ,  $x - y + 2z = 4$  and  $5x - 2y + z = 4$ , what is the value of  $x + y + z$ ?

*Solution:* Given  $2x + y - 3z = 3$  (1)

$$x - y + 2z = 4 \quad (2)$$

$$5x - 2y + z = 4 \quad (3)$$

By simplifying the Eq. (1) and (2), we get

$$3x - z = 7 \quad (4)$$

By simplifying the Eq. (2) and (3), we get

$$3x - 3z = -4 \quad (5)$$

By simplifying the Eq. (4) and (5), we get

$$z = \frac{11}{2}$$

By substituting the value of  $z$  in equation (4), we get

$$x = \frac{25}{6}$$

By substituting the values of  $x$  and  $z$  in any of the given equations,

$$\text{we get } y = \frac{67}{6}$$

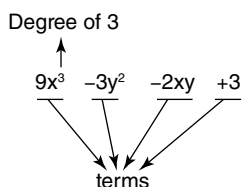
$$\therefore x + y + z = \frac{25}{6} + \frac{67}{6} + \frac{11}{2} = 20.8333... \text{ (By using calculator)}$$

$$= 20 \frac{5}{6} = 20.8333...$$

### The Degree of an Algebraic Expression

The highest power of any variable in the expression is called its degree. If an expression has only one variable, then the exponent is the degree. If an expression has more than one variable, then the sum of the exponents of all the variables is the degree.

In the given polynomial expression  $9x^3 - 3y^2 - 2xy + 3$ , the highest power of  $x$  is 3.



#### Tips

If a calculator is used for simplification and the answer is a decimal value, work back and identify the answer choice to match the decimal value.

### Degrees of Various Algebraic Expressions

Expression	Name
$x + 3, 2y + 3, 3 - 4y$	Has a degree of 1: <b>Linear</b>
$3x^2 + x + 3, xy + 1$	Has a degree of 2: <b>Quadratic</b>
$9x^3 + 3x^2 + 27, 2x^2y + xy + 1$	Has a degree of 3: <b>Cubic</b>
$8x^4 + 12x + 24$	Has a degree of 4: <b>Quartic</b>
$2x^5 + 12x + 24$	Has a degree of 5: <b>Quintic</b>

**Example:** Find the degree of the equations

(1)  $(2x + 3)(2x - 3)(x^2 - 1)$

(2)  $\sqrt{(x^2 - 2x + 2)(x^2 + 2x + 2)}$

**Solution:** (1)  $(2x + 3)(2x - 3)(x^2 - 1)$

$$= (4x^2 - 9)(x^2 - 1)$$

$$= 4x^4 - 13x^2 + 9$$

Hence, the degree of the equation is 4.

(2)  $\sqrt{(x^2 - 2x + 2)(x^2 + 2x + 2)}$

$$= \sqrt{(x - 2)^2(x + 2)^2}$$

$$= \sqrt{[(x - 2)(x + 2)]^2}$$

$$= (x - 2)(x + 2)$$

$$= x^2 - 4$$

Hence, the degree of the equation is 2.



#### Tips

An  $n^{\text{th}}$  degree equation must have  $n$  roots.

## Quadratic Equations

An algebraic equation which is in the form of  $ax^2 + bx + c = 0$  is called a quadratic equation, where  $a$ ,  $b$ , and  $c$  are constants and  $a \neq 0$ . The quadratic equation  $ax^2 + bx + c = 0$  can also be written in the form  $x^2 - (\alpha + \beta)x + (\alpha\beta) = 0$ , where  $\alpha$  &  $\beta$  are the solutions (roots) of the equation. A quadratic equation can be solved in three different ways according to the difficulty level of the problem.

### (1) The Quadratic Formula (for solving roots):

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

*Example:* Find the roots of the equation  $3x^2 - 4x - 4 = 0$

*Solution:* By comparing a given equation with:  $ax^2 + bx + c = 0$ ;  $a = 3$ ,  $b = -4$  and  $c = -4$   
Using the formula

$$\begin{aligned} x &= \frac{-(-4) \pm \sqrt{(4)^2 - 4 \times 3 \times (-4)}}{2 \times 3} \\ &= \frac{4 \pm \sqrt{16 + 48}}{6} \\ &= \frac{4 \pm \sqrt{64}}{6} = \frac{4 \pm 8}{6} \\ &= \frac{4+8}{6} \text{ or } \frac{4-8}{6} = 2 \text{ or } \frac{-2}{3} \end{aligned}$$

Hence, the roots of the equation are 2 and  $\frac{-2}{3}$ .



### Tips

The roots of a quadratic equation  $ax^2 + bx + c = 0$  are

$$\alpha = \frac{-b + \sqrt{b^2 - 4ac}}{2a}$$

and

$$\beta = \frac{-b - \sqrt{b^2 - 4ac}}{2a}$$

### (2) Factoring: This method of finding roots is preferred if the equation can be represented in terms of factors.

*Example:* A pizza store makes \$500 per day selling pizzas at a regular price. If the cost of each pizza is reduced by \$2, twenty more pizzas can be sold per day and the sales increased by \$60. What is the total number of pizzas sold after reducing the price?

*Solution:* Let ' $P$ ' represent the number of pizzas and ' $C$ ' represent the cost of each pizza, then

$$P \times C = 500 \quad (1)$$

$$(P + 20) \times (C - 2) = 560 \quad (2)$$

By modifying Eq. (1), we get

$$C = 500/P$$

Replace  $C$  with  $500/P$  in Eq. (2), we get  $(P + 20) \times \left( \frac{500}{P} - 2 \right) = 560$

Multiply the equation by  $P$  to get a quadratic equation

$$(P + 20) \times (500 - 2P) = 560P$$

Simplifying the equation

$$2P^2 + 100P - 10000 = 0$$

$$(P - 50)(P + 100) = 0$$

Hence,  $P = 50$  or  $-100$

Since  $P$  is number of pizzas,  $P$  must be positive.

Hence, the correct value for 'P' is 50, which is the number of pizzas sold at the regular price. You may be tempted to select 50 as the answer choice thinking that it is the right answer.

However, note that the question is to find the total number of pizzas that will be sold after reducing the price. Hence, the correct answer is  $50 + 20 = 70$ .



### Tips

In linear equations, to solve 'n' unknown variables, 'n' equations are required but in GRE, the questions that you encounter may have fewer equations than variables, which CAN be solved.

**(3) Plugging in:** Substitute the numbers given in the answer choice into the quadratic equation and find the option that satisfies the equation.

*Example:* Find the possible values of  $x$  that satisfy the quadratic equation

$$x^2 - 5x + 6 = 0$$

- (A)  $-2$       (B)  $-1$       (C)  $0$       (D)  $1$       (E)  $2$

*Solution:* Plug in different values from the options to satisfy the equation. You will find that the correct answer is E.

*Example:* Which of the following equations has a common root with the equation  $x^2 - 8x + 15 = 0$ ?

- (A)  $x^2 + 8x + 15 = 0$   
 (B)  $x^2 - 3x - 10 = 0$   
 (C)  $x^2 + 4x - 5 = 0$   
 (D)  $x^2 - x - 6 = 0$   
 (E)  $x^2 - 14x + 49 = 0$

*Solution:*  $x^2 - 8x + 15 = (x - 3)(x - 5) = 0$

The roots of  $x^2 - 8x + 15 = 0$  are 3 and 5. When these two values are substituted in each of the five choices to determine which equation holds true, we find that the values satisfy options B and D.

That is, Option B :  $(x - 5)(x + 2) = 0$

Option D :  $(x - 3)(x + 2) = 0$

*Example:* Find the sum and the product of the roots of  $2x^2 + 3x + 1 = 0$ ?

*Solution:* If  $\alpha$  and  $\beta$  are the roots of the equation,

Here,  $a = 2$ ;  $b = 3$ ;  $c = 1$

$$\text{Sum of the roots} = \alpha + \beta = \frac{-b}{a} = \frac{-3}{2}$$

$$\text{Product of the roots} = \alpha\beta = \frac{c}{a} = \frac{1}{2}$$



### Tips

For any quadratic equation  $ax^2 + bx + c = 0$  the sum of the roots is  $-b/a$  and the product of the roots is  $c/a$ .



## Properties of Inequality

If  $A$ ,  $B$ ,  $C$  and  $D$  represent algebraic expressions, then all the following inequalities are true.

Addition properties of inequality:

- If  $A < B$ , then  $A + C < B + C$
- If  $A > B$ , then  $A + C > B + C$

Subtraction properties of inequality:

- If  $A < B$ , then  $A - C < B - C$
- If  $A > B$ , then  $A - C > B - C$

Multiplication and division by a positive number:

- If  $A < B$  and  $C > 0$ , then  $AC < BC$
- If  $A > B$  and  $C > 0$ , then  $AC > BC$
- If  $A < B$  and  $C > 0$ , then  $A/C < B/C$
- If  $A > B$  and  $C > 0$ , then  $A/C > B/C$

These properties also apply to  $\leq$  and  $\geq$ .

- If  $A \leq B$ , then  $A + C \leq B + C$
- If  $A \geq B$ , then  $A + C \geq B + C$
- If  $A \leq B$ , then  $A - C \leq B - C$
- If  $A \geq B$ , then  $A - C \geq B - C$

Multiplication and division by a negative number:

- If  $A < B$  and  $C < 0$ , then  $AC > BC$
- If  $A > B$  and  $C < 0$ , then  $AC < BC$
- If  $A < B$  and  $C < 0$ , then  $A/C > B/C$
- If  $A > B$  and  $C < 0$ , then  $A/C < B/C$

These properties are also applicable to  $\leq$  and  $\geq$ .

### Note:

- Multiplying or dividing an inequality by any negative number causes a reversal of the inequality. It should be noted that changing the signs of all terms in a relationship is the mathematical equivalent of multiplying all terms by  $-1$ . Consequently, the expression  $7 - 2x > -3$  becomes  $-7 + 2x < 3$ .
- By interchanging the numerator and the denominator reverses the inequality can be reversed (but not always).

$$\frac{7}{2} > \frac{3}{4} \text{ becomes } \frac{2}{7} < \frac{4}{3} \text{ but } \frac{-4}{-2} > \frac{-1}{2} \text{ implies } \frac{-2}{-4} > \frac{2}{-1}$$

Find the possible value(s) of  $x$ , if  $x$  is a positive integer.



### Tips

By adding or subtracting values on either side of the inequality, the sign of the inequality will not change.

**Exp:** If  $2 < 3$ , then  
 $2 + 4 < 3 + 4$   
 and  
 $2 - 4 < 3 - 4$

Example:

$$\frac{2}{7} > \frac{1}{2x-3} > \frac{2}{13}; x \neq \frac{3}{2}$$

$$\frac{7}{2} < \frac{2x-3}{1} < \frac{13}{2}$$

[since Note (b)]

$$\frac{7}{2} + 3 < 2x < \frac{13}{2} + 3$$

[add 3]

$$\frac{13}{2} < 2x < \frac{19}{2}$$

$$\frac{13}{4} < x < \frac{19}{4}$$

[dividing by 2]

$$x = 4$$

Example:

$$5 \geq 4 - \frac{x}{3} \geq 2$$

$$5 \geq \frac{12-x}{3} \geq 2$$

$$15 \geq 12 - x \geq 6$$

$$3 \geq -x \geq -6$$

$$-3 \geq x \geq 6$$

therefore

$$x = \{-3, -2, \dots, 5, 6\}$$



### Tips

If  $a < b$  and  $c < d$  then,  $a + c < b + d$ .

## Linear Inequalities

A value that validates the inequality is the solution of that inequality. To solve an inequality, find the set of all the values of the variable that makes the inequality true. This set of values is also known as the solution set of the inequality.

Two inequalities that have the same solution set are called equivalent inequalities.

Example: Solve the inequality for  $x$ , where  $2x - 2 \geq 12$

Solution:  $2x - 2 \geq 12$

$2x - 2 + 2 \geq 12 + 2$  Add 2 to both sides of the inequality.

$$\Rightarrow 2x \geq 14$$

$\Rightarrow x \geq 7$  Divide both sides by 2.

Example:  $-2x + 3 > -3$

Solution:  $-2x + 3 > -3$

$-2x > -6$  Subtract 3 from both sides.

Divide both sides by  $-2$ .

$x < 3$ , (If both the sides of an inequality are multiplied or divided by a negative quantity, then the inequality is reversed.)

Example: Solve the inequality for  $x$ , where  $x - 12 < 2x - 4 < x$

Solution: There are two inequalities to solve.

$$x - 12 < 2x - 4 \text{ and } 2x - 4 < x$$

Solve the first inequality



### Tips

Multiplying or dividing both sides of an inequality by a negative number reverses the inequality.

$$\begin{aligned}
 x - 12 &< 2x - 4; \\
 x - 12 + 4 &< 2x - 4 + 4; && \text{(Add 4 to both sides)} \\
 x - 8 &< 2x \\
 x - 8 - x &< 2x - x: && \text{(Subtract } x \text{ from both sides)} \\
 -8 &< x && (1)
 \end{aligned}$$

Solve the second inequality

$$\begin{aligned}
 2x - 4 + 4 &< x + 4; && \text{(Add 4 to both sides of inequality)} \\
 2x &< x + 4 \\
 2x - x &< x + 4 - x; && \text{(Subtract } x \text{ from both sides)} \\
 x &< 4 && (2)
 \end{aligned}$$

From these two solutions, we get  $-8 < x < 4$ , i.e.,  $x$  must be greater than  $-8$  and smaller than  $4$ . Hence, the solution set for the inequality is the set of all the numbers greater than  $-8$  and less than  $4$ .

*Example 4:* Solve the inequality for  $x$ , where  $4x + 6 \leq 3x + 11$

*Solution:*

$$\begin{aligned}
 4x + 6 &\leq 3x + 11 \\
 4x - 3x + 6 &\leq 3x - 3x + 11 \\
 \text{(subtracting } -3x \text{ from both sides)} \\
 x + 6 &\leq 11 \\
 x &\leq 11 - 6; \\
 x &\leq 5
 \end{aligned}$$

$4x + 6 \leq 3x + 11$  is true for all real numbers less than or equal to  $5$ .



### Tips

Any equation that can be expressed in the form  $ax^2 + bx + c = 0$  (where  $a \neq 0$ ) is called a quadratic equation in  $x$ .

## Quadratic Inequalities

A quadratic inequality with one variable is of the form  $ax^2 + bx + c > 0$  or  $ax^2 + bx + c < 0$  or  $ax^2 + bx + c \geq 0$  or  $ax^2 + bx + c \leq 0$  where  $a, b, c$  are real numbers and  $a \neq 0$ . The values of ' $x$ ' which satisfy the given inequality are called the solutions of the inequality. One way of solving the inequalities is by factorizing the quadratic expression.

*Example:* For what values of  $x$ , the inequality  $x^2 - 12x + 32 < 0$  is true

*Solution:*  $x^2 - 12x + 32 < 0 \Rightarrow (x - 8)(x - 4) < 0$   
 $(x - 8)$  and  $(x - 4)$  are the factors of the expression. Hence,  $8$  and  $4$  are the roots of the quadratic equation  $x^2 - 12x + 32 < 0$ .  
 Since, the coefficient of  $x^2$  is positive, the expression  $x^2 - 12x + 32$  is negative, if  $4 < x < 8$ .  
 $\therefore$  the solution set is {the set of all real numbers between  $4$  and  $8$ }.

*Example:* Find the solution set of the inequality  $x^2 + 6x - 27 \leq 0$

*Solution:*  $x^2 + 6x - 27 \leq 0 = (x + 9)(x - 3) \leq 0$   
 Since, the coefficient of  $x^2$  is positive, the expression  $x^2 + 6x - 27$  is negative if  $-9 < x < 3$ , whereas the expression  $x^2 + 6x - 27$  is positive if either  $x < -9$  (or)  $x > 3$ .  
 Hence,  $x^2 + 6x - 27 \leq 0 \Rightarrow -9 \leq x \leq 3$ .  
 $\therefore$  the solution set is  $\{x \in R: -9 \leq x \leq 3\}$ .

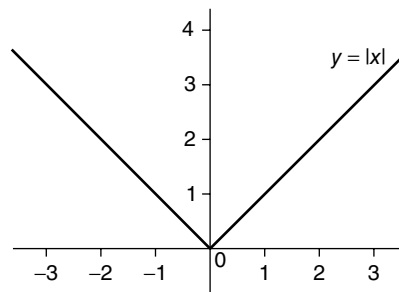
**Absolute Value:** In arithmetic, absolute value is tested on the real number line, whereas in algebra, absolute value is tested as an application of quadratic equations and inequalities.

**Definition:** The absolute value of  $x$  is defined as the positive value of  $x$ . That is, the distance of  $x$  from the origin on the number line (or rectangular coordinate system).

The absolute value of  $x$  is also defined as the mod function, it is denoted by

$$f(x) = |x|, \text{ where } |x| = \sqrt{x^2}$$

$|a| = \begin{cases} a & \text{if 'a' is positive i.e., } a > 0 \\ 0 & \text{if } a = 0 \\ -a & \text{if 'a' is negative i.e.,} \\ & \text{then } |x| \text{ is as shown on the graph in} \\ & \text{the rectangular coordinate system.} \end{cases}$



(rectangular coordinate system)



**Tips**

The concepts of absolute value of  $x$  are broadly tested in the applications of arithmetic and algebra.

**Properties of Mod function:**

S. No.	Form			On Number line
1.	$ x  = a$	$x = \pm a$	$x^2 = a^2$	
2.	$ x  < a$	$-a < x < a$	$x^2 < a^2$	
3.	$ x  \leq a$	$-a \leq x \leq a$	$x^2 \leq a^2$	
4.	$ x  > a$	$x < -a \text{ \& } x > a$	$x^2 > a^2$	
5.	$ x  \geq a$	$x \leq -a \text{ \& } x \geq a$	$x^2 \geq a^2$	
6.	$ x  =  a $	$ x  = a \text{ (or) } x =  a $		
7.	$ x - a  < b$	$a - b < x < a + b$		

**Example:** Find the sum of all positive even integer values of  $x$  that satisfy the inequality  $|x - 5| < 13$ ?

**Solution:** Since

$$|x - a| < b \Rightarrow a - b < x < a + b$$

Hence,

$$5 - 13 < x < 5 + 13 \Rightarrow -8 < x < 18$$

$\therefore$  the positive even integer values of  $x$  are  $\{2, 4, \dots, 16\}$

$$\text{Sum of these integers} = \left( \frac{2+16}{2} \right) \times 8 = 72$$

*Example:*  $x^2 = 100$  and  $|y| = 10$

<b>Column A</b>	<b>Column B</b>
$x$	$y$

*Solution:*  $x^2 = 100 \Rightarrow x = \pm 10$   
 $|y| = 10 \Rightarrow y = \pm 10$

This looks like Column A = Column B, but when  $x = 10$ , and  $y = -10$ , Column A > Column B and when  $x = -10$ , and  $y = 10$ , Column A < Column B.

Both the quantities cannot be uniquely compared.  
Hence, the correct answer is D.

### Practice Questions On Algebra

- (1) If  $2x + 5y = 26$  and  $5x + 2y = 23$ , then  $(x + y) =$  \_\_\_\_\_
- (2) If 11 times a number is a square of itself, then the number is \_\_\_\_\_
- (3) Find the roots of the equation  $x^2 - 3x + 2 = 0$ .
- (4) If 3 is one solution of the equation  $x^2 - 5x + b = 10$ , where  $b$  is a constant, what is the other solution?
- (5) If one root of the equation  $x^2 - kx + 48 = 0$  is three times the other, then find  $k$ ?
- (6) If  $\alpha$  and  $\beta$  are the roots of the quadratic equation  $2x^2 + 3x + 1 = 0$ , find the value of  $(\alpha + \beta)^2$ .
- (7) If an integer ( $x$ ) is multiplied by five times of itself and five is added to the product, the result is twenty six times of itself. Then  $x =$  \_\_\_\_\_.
- (8) The roots of the equation  $6x^2 - 11x + 23 = 0$  are reciprocal to the roots of the equation  $23x^2 - 11x + k = 0$ , then find  $k$ .
- (9) Find the number of integers, which satisfy the inequality  $x^2 < 50$ .
- (10) Find the solution sets of

(a)  $\left|7 + \frac{5}{x}\right| \leq 35$       (b)  $|2x + 3| \geq 15$       (c)  $x^2 - 7x - 44 \geq 0$

- (11) If  $x$  and  $y$  are integers,  $|x - 3| \leq 5$ ;  $|y - 2| \leq 8$  and  $(x - y) < k$ , then find the maximum value of  $k$ .
- (12) If  $|2x - 3| \leq 5$  and  $|5y - 2| \leq 8$

<b>Column A</b>	<b>Column B</b>
maximum value of $xy$	10

**Functions:** An algebraic expression in one or more variables is defined as a function. Functions are usually denoted by 'f', 'g' and 'h' with variables like  $x, y, z$  etc. For example, an algebraic expression in one variable is defined as

$$f(x) = 2x + 3$$

$$g(x) = x^2 + 1$$

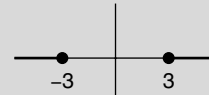
an algebraic expression in two variables can be expressed as

$$f(x, y) = 2x^2 + 3xy + 2y^2$$

$$g(x, y) = 3x + 4y \text{ etc.}$$



#### Tips



The above figure represents all the values between  $-a$  and  $+a$ , inclusive.



The above figure represents all the values between  $-a$  and  $+a$ , exclusive.



#### Tips

The discriminant of a quadratic equation  $ax^2 + bx + c = 0$  is given by  $b^2 - 4ac$ .

- (i) If  $b^2 - 4ac > 0$ , then the roots are real and unequal.
- (ii) If  $b^2 - 4ac = 0$ , then the roots are real and equal.
- (iii) If  $b^2 - 4ac < 0$ , then the roots are complex.

In GRE® the questions on functions are mostly tested on algebraic expressions with one variable.

i.e.,  $f(x) = 2x + 3$

where  $f(x)$  is the value of 'f' obtained by substituting the value of  $x$  in the expression above.

For example, in the function  $f(x) = 2x + 3$ .

$$\text{If } x = 0, f(0) = 3$$

$$\text{If } x = 1, f(1) = 5 \text{ etc.}$$

**Domain:** Domain is the set of all possible input values assigned to the variables in the algebraic expression.

For example, if  $f(x) = 2x + 3$ , the values of  $x$  that satisfy the function  $f(x)$  are called the input values and the set of these values is the domain of the function 'f' i.e., the set of all real numbers is the domain of the above function.

**Range of a Function:** Range is the set of all values of  $f(x)$  for all the values given in the domain set. The range set can be a finite set of numbers or the set of all real numbers (R).

For example, in the above function  $f(x) = 2x + 3$ , the set of all real numbers (R) is the range.

*Example:* Let 'f' be a function defined by  $f(x) = \frac{x^2 + 2}{(x - 2)(x - 3)}$ . In this case, the function 'f' is not defined at

$x = 2$  and  $x = 3$ , because at  $x = 2$  and  $3$ ;  $f(x) = \frac{6}{0}$  and  $\frac{11}{0}$  respectively are not defined.

Hence, the domain of  $f$  is the set of all real numbers except 2 and 3, defined as  $R - \{2, 3\}$ , where as the range set can be the set of all real numbers except zero because  $f(x)$  can be zero, only if  $x^2 + 2 = 0$  since domain is set of real numbers  $x^2 + 2 \neq 0$ . Hence, the range =  $R - \{0\}$ .

*Example:* Find the range and domain sets of  $g(x) = x^2 + 1$ .

*Solution:* Since the function 'g' takes any real number, the domain is  $R$  and the range is  $R^+$  ( $\because x^2 + 1 > 0 \forall x \in R$ ), hence the output is only positive.

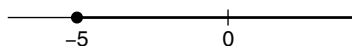
*Example:* Find the domain of the function  $f(x) = 5x^2 + \sqrt{x + 5} - 5$ .

*Solution:* In this case the domain depends on the possible inputs and the possible outputs.

Since the output (range) cannot be an imaginary number, in the given function  $\sqrt{x + 5}$  must be a real number

$$\therefore \sqrt{x + 5} \geq 0 \text{ for all } x \geq -5$$

Hence, the domain is all real numbers greater than or equal to  $-5$ . On the number line the domain is represented as



*Example:* Find the domain of a function  $f(x) = \frac{x^2}{|x| - 3}$

*Solution:* The function  $f(x)$  is valid if  $|x| - 3 = 0$  if  $x = -3$  or  $x = 3$ .

Hence, the function is not valid for  $x = -3$  and  $x = 3$

$\therefore$  the domain of  $f(x)$  is  $R - \{3, -3\}$ .



### Tips

Sometimes the domain of a function explicitly given is confined to a set of values of  $x$ .

*Example:* We can define the function  $g(x) = x^2 + 1$  for  $-5 \leq x \leq 5$ .



### Tips

The representation ' $\forall x \in R$ ', means for every real number  $x$ .



### Tips

The representation ' $R - \{0\}$ ' means all real numbers except zero.

**Note:** 1. If  $f(x) = k$ , the function is called a constant function.

*Example:*  $f(x) = 2 \forall x \in R$

That is,  $f(1) = 2$ ,  $f(2) = 2$  .....etc., domain:  $R$ , and range:  $2$

2.  $f(x) = (-1)^x$  then  $f(x) = 1$  if  $x$  is even  
 $= -1$  if  $x$  is odd

domain:  $R$ , and range:  $\{1, -1\}$

**Inverse Function:** In the GRE® the concept of an inverse function is not directly tested. But the questions asked appear as if they were the inverse of a function. The functional form of an algebraic expression is represented as  $f(x) = ax + b$  (or)  $g(x) = ax^2 + bx + c$  ....etc. So, for every input value of  $x$  (domain), the expression results in an output (range).

Similarly, for every element in the range there must be at least one corresponding input in the domain. This is represented as  $f^{-1}$  of  $x$  represented by  $f^{-1}(x)$ .

For example, if ' $f$ ' is defined from  $A$  to  $B$ ,  $f^{-1}$  is defined from  $B$  to  $A$ , where  $A$  is the domain of ' $f$ ' and  $B$  is the range of ' $f$ '. Similarly  $B$  is the domain of  $f^{-1}$  and  $A$  is the range of  $f^{-1}$ .

*Example:* If  $f(x) = \frac{x^2 - 3}{2}$ ; and  $f(t) = u$ , then find the value of ' $t$ ' in terms of  $u$ .

*Solution:*  $f(t) = \frac{t^2 - 3}{2} = u \Rightarrow t^2 = 2u + 3 \Rightarrow t = \sqrt{2u + 3}$

*Example:* If  $f(x) = 2x + 3$ , then  $f^{-1}(x) = ?$

*Solution:* Let  $f(x) = y$  then  $f^{-1}(y) = x$

$$\therefore y = 2x + 3 \Rightarrow x = \frac{y - 3}{2}$$

$$\therefore f^{-1}(x) = f^{-1}\left(\frac{y - 3}{2}\right) = \frac{f^{-1}(y) - f^{-1}(3)}{f^{-1}(2)} = \frac{x - 3}{2}$$

**Note:** If  $f(x) = y$ , then  $f^{-1}(y) = x$ ,  $f^{-1}$  is called inverse function of  $f$ .

*Example:* Let  $f(x) = 2x + 3$  then  $f^{-1}(x) = \frac{x - 3}{2}$

That is, for  $x = 1$ ,  $f(x) = 2(1) + 3 = 5$

and for  $x = 5$ ,  $f^{-1}(5) = \frac{5 - 3}{2} = 1$



**Tips**

For any real number  $k$

$$\text{If } f(k) = k \\ f^{-1}(k) = k$$

## PRACTICE QUESTIONS

1. What is the value of

(a)  $f(x) = 6x^2 - 6x + 6$  when  $x = 6$ ?

(b)  $g(x) = \frac{x^2 - 4}{x - 2} \times (x + 3)$  when  $x = 2$ ?

(c)  $h(x) = \frac{5x}{2} + \frac{3x^2}{4} - 8$  at  $x = 2$ ?

2. Which of the functions given below shows  $f(x) = f(-x)$ ?

(I)  $x^2 + 1$     (II)  $(x - 1)(x + 1)$     (III)  $x + 1$

(IV)  $x$     (V)  $x|x|$     (VI)  $\sqrt{x^2}$

3. If a function ' $f$ ' is defined on all non-zero real numbers where  $f(x) = \frac{x^2}{|x|}$ , then which of the following must be true?
- (I)  $f(x) < 1$                       (III)  $f(x) > 1$   
(II)  $f(x) \geq 0$   
(a) I and II only                      (d) I, II and III  
(b) II and III only                      (e) None of these  
(c) I and III only
4. Find the inverse functions of the following.
- (I)  $f(x) = 3x + 7$   
(II)  $f(x) = x^2 + 9$   
(III)  $f(x) = \sqrt{x^2 + 2x + 1}$   
(IV)  $g(x) = x^2$   
(V)  $f(x) = |ax| + b|x|$  where  $x \in R^+$
5. Identify the range of the function  $f(x) = x^7 + 10$  on the number line.



# CHAPTER 19

## Word Problems

### ***Word Problems***

In the *GRE*<sup>®</sup>, questions that deal with algebraic translation are called word problems. Word problems primarily require comprehension of the key words and expressions in the problems. In a typical word problem, there is at least one sentence that provides information followed by a question statement. The best way to solve word problems is to translate verbal descriptions into algebraic expression.

It is useful to remember the keywords that are normally used for the basic mathematical operations.

### ***Keywords that Indicate Addition (+)***



#### **Tips**

Word problems account for a significant portion of the questions on the GRE. Hence, practice more of the word problems to ensure that you gain more confidence in solving them.

Sum of; more than; combined; together; added; total; greater than; older than; farther than.

For example, Jane is three years older than her 6-year-old sister Mary.

This is written as Jane's age (J) = Mary's age (M) + 3 = 6 + 3 = 9.

### ***Keywords that Indicate Subtraction (−)***

Difference of; decreased by; reduced by; less than; fewer than; younger than.

For example, after three months of workout, John reduced his weight by 3 pounds.

John's new weight = John's old weight − 3.

### Key Words that Indicate Multiplication ( $\times$ )

multiplied by; times; of

*Example:* Starting from town A, Tom drives his car at 50 miles per hour, and Dave drives his car three times faster than Tom drives. What is the distance traveled by Dave after two hours?

*Solution:* Dave's speed is three times faster than Tom's speed.

Hence, Dave's speed =  $3 \times 50$  miles per hour = 150 miles per hour.

$\therefore$  Dave travels 150 miles in one hour.

(Remember that 150 is an intermediate result and a possible trap choice).

Hence, in two hours, Dave will travel  $150 \times 2 = 300$  miles.

### Keywords that Indicate Division ( $\div$ )

Divided by; parts of; out of; per; ratio of; for; for every.

*Example:* Catherine's car consumes four gallons of gasoline for every hundred miles. What is the car's mileage? (number of miles per gallon)

*Solution:* Four gallons of gasoline for every 100 miles implies that for every 1 gallon of gasoline, the car travels

$\frac{100}{4} = 25$  miles. The mileage of her car is 25 miles per gallon.

### Translation

The primary stumbling block for test-takers is translating word problems into algebraic expressions.

*While solving word problems, check for the following:*

- What is being asked in the question?
- What are the units used in the given information?
- What are the units used in the question?
- Whether the units used in the question and the information given are different? (Change the units, so that they are uniform).
- What algebraic expression(s) can be used?
- Can any of the known formulae be applied?

Word problems could be tested in the following areas:

- Ages and populations.
- Mixtures, alligations, and weighted averages.
- Time, speed and distance.
- Time, rate and work.
- Applications:
  - (a) Percentages, profit and loss, and discounts.
  - (b) Simple and compound interest.
  - (c) Sets.



#### Tips

The most difficult part of a word problem is translating words into an algebraic equation(s) correctly.

**Translation Examples:**

1. If a number is multiplied by itself and then 7 is subtracted from the product, the result can be represented by  $(x^2 - 7)$ .
2. Two-third of a number is added to one-third of itself and the result is the number itself. This can be represented as  $\frac{2x}{3} + \frac{x}{3} = x$ .
3. If Joy's present weight( $w$ ) is decreased by 12 percent, then his new weight is  $(8-8w)$  pounds.
4. If the age of Andrus is 11 times the age of his son and the sum of their ages is ' $p$ ' years, then son's age can be represented by  $p - 11s$ .
5. Mr Jack retained one fourth of his property and distributed the rest evenly to his three children. He later distributed the retained amount evenly to all the three children, then each child will get

$$\left[ \frac{P}{4} + \left( \frac{P/4}{3} \right) \right]$$

**Tips**

To evaluate an algebraic expression, plug in the given values for the variables and then calculate by following the order of operations.

**Ages and Populations**

In general, the problems on ages and populations can be solved by establishing the relation between the present tense, past tense and future tense. These relations are represented in a tabular form, which helps in translating the information given into equational forms.

The table below will help in establishing and translating the information.

' $n$ ' Years Ago	Present Age	After ' $n$ ' Years
$-n$	Now	$+n$
$G - n$	$G$	$G + n$

There are two types of age problems: The problems with numeric values and the problems with variables.

*Example:* ' $n$ ' years ago, the age of George was ' $n$ ' years, then what will be his age after ' $n$ ' years (in terms of  $n$ ) from now?

*Solution:*

$-n$	Now	$+n$
$P - n$	$P$	$P + n$

Given  $G - n = n \Rightarrow G = 2n$

$\therefore G + n = 3n$

George's age after ' $n$ ' years is  $3n$ .

*Example:* Five years ago, the ratio between ages of  $A$  and  $B$  was  $7 : 2$ , and the ratio of their ages after 5 years will be  $9 : 4$ , then what is the present age of  $A$ ?

*Solution:*

$-5$	Now	$+5$
$A - 5$	$A$	$A + 5$
$B - 5$	$B$	$B + 5$

Given:  $\frac{A-5}{B-5} = \frac{7}{2} \Rightarrow 2A - 7B = -25$  (1)

$$\frac{A+5}{B+5} = \frac{9}{4} \Rightarrow 4A - 9B = 25$$
 (2)

By multiplying Eq. (1) with 2 and subtracting the result from equation (2), we get

$$4B - 9B = 25.$$

$$2(2A - 7B) = (-25)2$$

$$5B = 75 \Rightarrow B = 15$$

and  $A = 40$  [by substituting in Eq. (1)]. Hence, the present age of  $A$  is 40.



**Tips**

The past tense is represented by a negative sign.

And

The future tense is represented by a positive sign.

## Exponential Growth

Such questions are based on quantities that increase at a constant rate in equal intervals of time. These type of problems can be solved better solved by drawing a timeline and marking the timeline at regular intervals, which represent the values that increase or decrease as per the given rate.

*Example:* A city has a population of one million and the population doubles every 20 years. In how many years will the population grow to 16 million?

*Solution:* In twenty years, the population will be 2 million. Twenty years later, the population will be 4 million, another 20 years later, the population will be 8 million, and so on. Hence, after 80 years, the population will be 16 million.

*Example:* The population of a country, 30 years ago, was 2 million. The population doubles every 3 years, then what is the present population of the country?

*Solution:* The information given can be represented in a tabular form.

	Age	Population
30 years ago	-30	2 million
	-27	$2^2$ million
	-24	$2^3$ million
	—	—
	—	—
	-3	$2^9$ million
Present age	Now	$2^{10}$ million

Hence, the present population of the country is  $2^{10}$  million = 1024 million.

## Practice Questions

- The present ages of  $A$  and  $B$  are in the ratio of 5 : 3. Four years ago, the ratio of their ages was in the ratio of 3 : 1. What will be the ratio of  $A$ 's age to  $B$ 's age 4 years from now?
- A certain bacterium in a Petri dish triples every 12 hours. If there are 10,000 bacteria to begin with, how many bacteria will be there after 60 hours?
- Tom is using an antibiotic to overcome a viral infection. The antibiotic reduces the number of infected cells by 50% every 4 hours. If two million cells are infected in Tom's body, after how many hours will the number of infected cells be fewer than 200,000?



### Tips

Problems on ages, populations, and exponential growth can also be solved by work-back method (working back from answer choices).

## Average

The term average is used to represent a group with a single value.

$$\text{Average} = \frac{\text{Sum of the terms}}{\text{number of terms}}$$

∴ Sum of the terms = Average × Total number of terms

*Example:* Find the average of 48, 53, 65, 67 and 72,

$$\text{Solution: Average} = \frac{48 + 53 + 65 + 67 + 72}{5} = \frac{305}{5} = 61$$

*Example:* If Kellin's average score in 5 exams is 80, and the scores in 4 of those exams are 97, 85, 79 and 84, then find the score in the 5th exam.

*Solution:* Let 'x' be the score in Kellin's 5th exam, then

$$\begin{aligned} \text{Kellin's average score in 5 exams} &= \frac{97 + 85 + 79 + 84 + x}{5} = 80 \\ &= \frac{345 + x}{5} = 80 \Rightarrow x = 400 - 345 = 55 \end{aligned}$$

Hence, Kellin scored 55 in the fifth exam.



### Tips

The average of the terms will always be between the highest and the lowest terms.

## Weighted Average

It is a method of computing the arithmetic mean of a set of numbers in which some numbers are more important than the others.

$$W = \frac{m_1 n_1 + m_2 n_2 + m_3 n_3 + m_4 n_4 + \dots + m_n n_n}{n_1 + n_2 + n_3 + n_4 + \dots + n_n}$$

where  $m_1, m_2, \dots$  are different numbers and  $n_1, n_2, \dots$  represent the respective frequencies.

*Example:* A box contains 10 bars of chocolate worth 40 cents each, 20 bars of chocolate worth 25 cents each and 30 bars of chocolate worth 10 cents each. Find the average price of each chocolate (in cents).

*Solution:* The weighted average price of each chocolate in the box

$$= \frac{10 \times 40 + 20 \times 25 + 30 \times 10}{10 + 20 + 30} = \frac{1200}{60} = 20 \text{ cents}$$

## Mixtures

The problems on mixtures is an application of weighted average and the arithmetical concepts like ratios and proportion. In general, problems on mixtures are solved by alligation, but the *GRE*<sup>®</sup> deals with applications of maths. So, these problems are solved logically and strategically.

*Example:* 4 pounds of wheat at \$1.50 is mixed with 8 pounds of wheat at \$2 per pound. Find the average price of the mixture.

*Solution:*  $\frac{4 \times 1.5 + 8 \times 2}{12} = \frac{22}{12} = \frac{11}{6} = \$1.8\bar{3} = \$1.83$  (rounding the decimal to the hundredth place)

Hence, the average price of the mixture = \$1.83.



### Tips

An alligation method is an application of weighted average.

## Practice Questions

- Find the average of the following sets:
  - Set of all prime numbers less than 30
  - 50, 55, 70, 73, 67
- If the average of 35, 40, 63, 57, 44,  $x$ , and  $y$  is 70, then the average of  $x$  and  $y$  is equal to \_\_\_\_\_.
- In a class of 60 students, the height of 10 students is 5 feet, for 20 students it is 5 feet 2 inches and the height of the rest of the students is 5 feet 6 inches. What is the average height of the students in the class?
- In a mixture of 8 ounces of alcohol and water, alcohol is 40% by volume. How many ounces of water must be added to the mixture to reduce the concentration of the alcohol to 15%?

## Rate

**Rate** is a ratio that compares two quantities with different units. Usually, the rate is per unit time. (i.e., the rate can be defined as change in distance per unit time, the amount of work done per unit time, change in speed in unit time, change in temperature per unit time, etc.) In the *GRE*<sup>®</sup>, questions on rate are based on speed and work.

To express the relation among speed, time, and distance, we use the formula:

Speed =  $\frac{\text{Distance}}{\text{Time}}$  (Distance is measured in miles and time is measured in hours, minutes, and seconds.)

To express the relation among rate, time, and work, we use the formula:

$$\text{Rate} = \frac{\text{Work}}{\text{Time}}$$

**Note:** Units of rate should be written as a fraction of units of work in the numerator and the units of time in the denominator.

*Examples:* (a) A person travelled 70 miles in 2 hours. He travelled at a speed of 70 miles per 2 hours = 35 miles/hour.

(b) A man can plant 100 trees in 10 hours, the rate of work done is represented by 100 trees per 10 hours = 10 trees/hour.

**Note:** When you solve problems on rate, it is important to convert the units appropriately before simplifying the expressions.



### Tips

Work is always taken as one unit. Work can be of any nature, like painting a wall, digging a ditch, washing a car, constructing a building, etc.

For example, if the speed is in miles per hour (mph), then the time needs to be in hours, and the distance in miles. If the time is given in minutes, divide it by 60 to convert it into hours, before using the equation to find the distance in miles.

**Note:** Rates are generally given as part of a proportion.

*Examples:* (a) The speed of a car is 10 mph.

(b) Mike ran 1 mile in 10 minutes  
= 1 mile/10 minutes = 6 miles/hour.

(c) The sewing machine sewed 20 stitches a second  
= 20 stitches/second = 720 stitches/hour.

### Time and Work

The problems on work involve different people working together at different rates and different time intervals. The rate of work 'R' is directly proportional to the amount of work done 'W' and inversely proportional to the time taken 'T' to complete the work.

$$\text{Rate} = \frac{\text{Work}}{\text{Time}} \Rightarrow R = W / T$$

**Some important formulae for 'Work' problems are given below:**

- If a person can do a piece of work in  $x$  days, then the amount of work done in one day =  $(1/x)$ .
- If a person does  $1/x$  work in 1 day, he can finish the work in ' $x$ ' days.
- If  $A$  can do a piece of work in  $x$  days and  $B$  can do the same work in  $y$  days, together they can complete the work in  $\frac{xy}{x+y}$  days.
- If  $A$  and  $B$  together take  $x$  days to complete a task and  $B$  takes  $y$  days to complete the same task,  $A$  alone can complete the task in  $\frac{xy}{y-x}$  days.



#### Tips

If  $A$  and  $B$  can do a certain job in ' $r$ ' and ' $s$ ' hours respectively, and both  $A$  and  $B$  together can do the same job in ' $h$ ' hours, then  $\frac{1}{h} = \frac{1}{r} + \frac{1}{s}$ .

*Example:* Michael can do a piece of work in 5 hours, while Cathy can do the same work in 4 hours. How long will it take for both of them, working together, to complete the work?

*Solution:* Michael can do  $1/5$ th of the work in one hour. Cathy can do  $1/4$ th of the work in one hour. The amount of work that can be completed in one hour, if both of them work together =  $\frac{1}{5} + \frac{1}{4} = \frac{9}{20}$

$\therefore$  the time taken by Michael and Cathy together to complete the work is  $\frac{20}{9}$  hours.

### Practice Questions

1. Two machines  $A$  and  $B$  can print  $x$  copies in 10 and 15 minutes respectively. Find the time taken by both the machines to print  $x$  copies working together?
2. Two copying machines working together can make copies in 16 minutes. If one machine is twice as fast as the other, how long will the slower machine take to complete the job working alone?

- Pipe  $A$  can fill a pool in 5 days and pipe  $B$  can fill the same pool in 3 days. Find the time taken to fill the pool, if both the pipes are operated simultaneously, and how long will it take to fill the pool, if the second pipe stops working after a day?
- It takes 30 days for 10 men to construct a house. When the job is half done, five more men are added. What is the total time taken to complete the job?

### Time, Speed and Distance

The problems on speed involve different people or vehicles travelling together with different speeds and different time intervals. The speed is directly proportional to distance travelled ‘ $D$ ’ and inversely proportional to the time taken ‘ $T$ ’.

$$\text{Speed} = \frac{\text{Distance}}{\text{Time}} \Rightarrow S = D/T$$

**Example:** Princey travels at 50 miles per hour. How long will it take for her to cover a distance of 200 miles?

**Solution:** Distance = Speed  $\times$  Time

$$\text{Time} = \frac{\text{Distance}}{\text{speed}} = \frac{200 \text{ miles}}{50 \text{ miles per hour}} = 4 \text{ hours}$$

### Relative Speed

The speed at which a point, that is being observed, is moving with respect to the observer is called relative speed.

- When two bodies are moving at speeds  $u$  and  $v$  in opposite directions, the relative speed is  $(u + v)$ .
- When two bodies are moving at speeds  $u$  and  $v$  in the same direction, then the relative speed is  $(u - v)$ .
- The distance traveled by the train to cross a bridge or another train that is stationary is given by the sum of both the lengths.

Now, the time taken by the train to cross the bridge (or another train) is given by,

$$\frac{\text{Length of the train} + \text{Length of the bridge (train)}}{\text{Speed of the train}}$$

**Note:** The distance traveled by a train to cross a single point is equal to the length of the train.

**Example:** Two cars start at the same time from City  $A$  to reach City  $B$  in a straight highway at 40 miles/hr and 60 miles/hr respectively. After how many hours would the distance between the two cars be 100 miles?

**Solution:** Given  $u = 60$  mph,  $v = 40$  mph,  $d = 100$  miles

$$\text{Time} = \frac{\text{Distance}}{\text{Relative Speed}} = \frac{100}{60 - 40} = \frac{100}{20} = 5 \text{ hours}$$

After 5 hours, the distance between the 2 cars is 100 miles.



**Tips**

Use the formula Time = distance/speed to compute any one of the quantities if the other two are known. Distance is directly proportional to Speed and Time.



**Tips**

**Conversions:**

- 1 mile = 1609 meters = 1760 yards = 5280 feet.
- 1 km = 1000 meters.
- 1 meter = 10 decimeters.
- 1 decimeter = 10 centimeters = 100 millimeters.
- 1 yard = 3 feet.
- 1 feet = 12 inch =  $12 \times 2.54$  centimeters  $\frac{5}{18}$  meters/second.



### Average Speed

The average speed of the entire journey depends on the total distance traveled and the total time taken to cover the complete distance.

$$\text{Average speed} = \frac{\text{Total distance covered}}{\text{Total time taken}}$$

If a person traveled different distances  $d_1, d_2, \dots, d_n$  with different speeds  $s_1, s_2, \dots, s_n$  in different times  $t_1, t_2, \dots, t_n$  respectively, then the average speed of the entire trip is given by:

$$\text{Average speed} = \frac{d_1 + d_2 + \dots + d_n}{t_1 + t_2 + \dots + t_n} = \frac{s_1 t_1 + s_2 t_2 + \dots + s_n t_n}{t_1 + t_2 + \dots + t_n}$$

If a person travels half the journey at a speed of  $S_1$  and the rest at a speed of  $S_2$ , then the average speed is given by,

$$\text{Average speed} = \frac{\text{Total distance}}{\text{Total time}} = \frac{2d}{t_1 + t_2}$$

Since,

$$S \times T = D; \Rightarrow T = D/S$$

$$\text{Average Speed} = \frac{2d}{\frac{d}{s_1} + \frac{d}{s_2}} = \frac{2s_1 s_2}{s_1 + s_2}$$

If a person travels a certain distance at a speed of  $S_1$  mph and returns at a speed of  $S_2$  mph, then the average speed is given by:

$$\text{Average Speed} = \frac{2s_1 s_2}{s_1 + s_2}$$

*Example:* A car traveled 200 miles at 40 mph and 300 miles at 30 mph. Find the average speed of the car for the entire journey.

$$\begin{array}{ll} \text{Solution: Given, } d_1 = 200 & d_2 = 300 \\ s_1 = 40 & s_2 = 30 \\ t_1 = \frac{200}{40} & t_2 = \frac{300}{40} \\ = 5 \text{ hrs} & = 10 \text{ hrs} \end{array}$$

$$\text{Average speed} = \frac{d_1 + d_2}{t_1 + t_2} = \frac{200 + 300}{5 + 10} = \frac{500}{15} = 33\frac{1}{3} \text{ mph}$$



#### Tips

The average speed is always less than or equal to the average of the

$$\text{speeds } \frac{2s_1 s_2}{s_1 + s_2} \leq \frac{s_1 + s_2}{2}.$$

### Practice Questions

1. A car traveled 50 miles at 60 mph and another equal distance at 80 mph, then find the average speed of the car over 100 miles.
2. A bus travels from  $A$  to  $B$  at a speed of 45 mph and returns at 55 mph, then find the average speed of the bus to cover the entire trip.
3. Two cars start towards each other at 60 mph and 40 mph from two cities that are 500 miles apart at the same time. Find the time taken by the cars to meet each other.

## Applications

The translation of verbal descriptions into algebraic expressions is called algebraic translation and word problems are the applications of algebraic translations. The questions that deal with percentages, profit and loss, discounts, simple interest and compound interest, sets, etc., which involve unknown variables are also tested under word problems.

*Example:* Monthly rent of a pen manufacturing unit is \$5000. The cost of manufacturing a pen is \$0.25. The pens are sold to the retailers at \$0.75 per pen. How many pens should be sold to the retailer to break-even, assuming that there are no other costs associated with the manufacturing unit? How many pens should be sold to the retailer to make a profit of \$3000 per month?

*Solution:* The total cost per month ( $C$ ) =  $5000 + 0.25 \times$  Number of pens ( $P$ ) and the total revenue per month is ( $R$ ) =  $0.75 \times P$ .

To find the number of pens ( $P$ ) to be sold to break-even,  $R$  should be equal to  $C$ .

$$\begin{aligned} \text{That is} \quad & 5000 + 0.25P = 0.75P \\ \Rightarrow & 5000 = 0.50P \\ \Rightarrow & P = 10000 \end{aligned}$$

Number of pens to be sold to make a profit of \$3,000 per month, ( $R - C$ ) should be equal to 3000

$$\begin{aligned} \text{That is} \quad & 0.75P - (5000 + 0.25P) = 3000 \\ \Rightarrow & 0.50P = 8000 \\ \Rightarrow & P = 16000 \end{aligned}$$

*Example:* A person buys a book for \$4 and sells it for \$5. Find the percentage gain.

*Solution:* Cost Price (C.P.) = \$4

Selling Price (S.P.) = \$5

Gain (S.P. - C.P.) = \$5 - \$4 = \$1 (Remember, this is an intermediate result and a possible trap choice).

$$\text{Gain percentage} = \frac{\text{Gain}}{\text{C.P.}} \times 100 = \frac{1}{4} \times 100 = 25\%$$

*Example:* Ann earns an interest of 3% per annum on \$500. What is the total amount that she will earn at the end of the second year?

$$\begin{aligned} \text{Solution:} \quad A &= p \left( 1 + \frac{R}{100} \right)^T \\ &= 500 \left( 1 + \frac{3}{100} \right)^2 \\ &= 500 \times \frac{103 \times 103}{100 \times 100} = \frac{103 \times 103}{20} \\ &= \$530.45 \end{aligned}$$



### Tips

First, choose a value for the least unknown variable and then calculate the other unknown variables in terms of the first variable.

Next, write an equation based on the situation given. Most test problems pivot on two quantities being equal.

Finally, solve the equation and interpret the result.



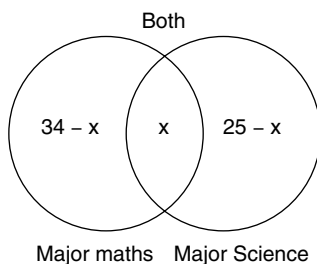
### Tips

$$n(A \cup B) = n(A) + n(B) - n(A \cap B).$$

*Example:* There are 54 students in a class. If 34 students major in maths and 25 students major in science, how many students will major in both the subjects?

*Solution:* Let  $x$  students major in both subjects.

$$\begin{aligned} 34 - x + x + 25 - x &= 54 \\ 59 - x &= 54 \\ x &= 59 - 54 = 5 \end{aligned}$$



### Practice Questions

1. A stock's initial purchase order (IPO) is at \$15, but during the first day's trading, the price of the article jumped up by 150%, then what would be its closing price?
2. A company sold a product for \$ $x$  in 1990. Thereafter, the price of the product increased by 2.5% every year. Which of the following expressions could be used to calculate the price of the product in the year 2000?
3. If Mr. Jack borrowed \$500 at 10% simple annual interest for 3 years, how much would Jack have to repay at the end of 3 years?
4. If Mike borrowed \$500 at 10% annual interest, compounded quarterly, for 3 years, how much would Mike have to repay at the end of 3 years?
5. In a class of 200 students, there are 155 girls. How many girls have to join so that there are 80% girls in the class?
6. The set  $S$  consists of three consecutive integers. The least value of the set is 64. What are the mean and the median of the set?



#### Tips

Do not perform intermediate calculations. GRE questions are designed by examiners who normally prefer uncomplicated answers.

## PRACTICE EXERCISES

### Exercise No. 1

*Directions:* Select all the options that are correct as per the information given in each question. Remember that one or more options may be correct.

- |  |   |
|--|---|
| <p>1. Which of the following equations have common roots with <math>2x^2 - 9x + 10 = 0</math>?</p> <p>(A) <math>x^2 - 7x + 12 = 0</math>      (D) <math>2x^2 + 5 = 7x</math></p> <p>(B) <math>x^2 - 5x + 6 = 0</math>      (E) <math>2x^2 - 7x + 6 = 0</math></p> <p>(C) <math>6x^2 + 30 = 27x</math>      (F) <math>x^2 + 5x + 8 = 0</math></p> | <p>2. If <math>1 &gt; x &gt; 0</math>, then which of the following is true?</p> <p>(A) <math>1 &gt; x &gt; \sqrt{x} &gt; 0</math></p> <p>(B) <math>1 &gt; \sqrt{x} &gt; x &gt; 0</math></p> <p>(C) <math>\sqrt{x} &lt; 0 &lt; x &lt; 1 &lt; x^2</math></p> <p>(D) <math>0 &lt; x &lt; 1 &lt; \sqrt{x} &lt; x^2</math></p> <p>(E) <math>0 &lt; x &lt; x^2 &lt; 1 &lt; x^{-2}</math></p> <p>(F) <math>0 &lt; \sqrt{x} &lt; 1 &lt; x^{-2}</math></p> |
|--|---|

3. If  $0 < x < \frac{1}{2} < y < 1$ , which of the following would be true? (Indicate all the possible answers)
- (A)  $\frac{1}{2} > X$  (E)  $x + y = 1$   
 (B)  $\frac{1}{2} < \frac{1}{3}$  (F)  $x + y > 2$   
 (C)  $\frac{1}{y} > 2$  (G)  $x + y > \frac{3}{2}$   
 (D)  $xy < \frac{1}{2}$
4. Mike purchased apples and peaches for \$4.40. If each apple costs \$0.26 and each peach costs \$0.12, how many apples did he purchase?
- (A) 4 (D) 12  
 (B) 8 (E) 16  
 (C) 10 (F) 18
5. Function  $h(x)$  is defined as  $x^3 - 3x^2 - bx + 25$ .  $(x - 2)$  is one factor of  $h(x) - 1$ . For what values of  $x$  will  $h(x)$  be equal to 1? (Indicate all the possible answers)
- (A) -4 (D) 0  
 (B) -3 (E) 3  
 (C) -2 (F) 4
6. The maximum time taken by a bird to cover 720 miles is 15 hours. Which of the following is the speed of the bird? (Indicate all the possible answers)
- (A) The bird's average speed is 48 mph (or) more  
 (B) The bird's average speed is 47 mph  
 (C) The bird's average speed is 50 mph (or) less  
 (D) The bird's average speed is less than 48 mph  
 (E) The bird's average speed is 46 mph (or) more  
 (F) The bird's average speed is 50 mph
7. Which of the the following order pair satisfies the inequation  $2x + 3y \geq 5$ ? (Indicate all the possible answers)
- (A) (-2, 1) (D) (-1, -4)  
 (B) (1, 1) (E) (2, 4)  
 (C) (2, 2)
8. A trader sells at a price that is  $x\%$  more than the cost price of the article. If he wants to make a profit of at least 10%, what is the discount (in percentage) that can be offered? (Indicate all the possible answers)
- (A)  $\frac{100(10-x)}{100+x}$  (D)  $\frac{105(x-10)}{100+x}$   
 (B)  $\frac{25(x-10)}{100+x}$  (E)  $\frac{90(x-10)}{100-x}$   
 (C)  $\frac{100(x-10)}{100+x}$  (F)  $\frac{100(x-10)}{100-x}$
9. What are the values of 'x' that satisfy the inequality  $\frac{3}{4} < \frac{x}{x-1} < \frac{7}{8}$ ? (Indicate all the possible answers)
- (A) -7 (D) -4  
 (B) -6 (E) 4  
 (C) -5 (F) 5
10. 'a' is a positive integer and  $a^3 - 4a = 315$ . What is the value of  $\frac{a^2+1}{a-2}$ ? (Indicate all the possible answers)
- (A) 7 (D) 10  
 (B) 8.7 (E) 12  
 (C) 9.25

### Exercise No. 2

**Directions:** Select the correct option from the choices that follow each question.

1.  $102x - 105y = 80$ ;  $24x - 20 = 20 - 4y$   
 If  $x$  and  $y$  satisfy the system of linear equations above, what is the ratio of  $x$  and  $y$ ?
- (A) 1 : 6 (D) 51 : 8  
 (B) 5 : 2 (E) 113 : 54  
 (C) 21 : 2
2. If  $g(x) = f(x^2)$ , which of the following functions does equal  $f(x)$  such that it satisfies the relation  $g(x) = [f(x)]^2$
- (A)  $3x$  (D)  $\frac{1}{2x^2}$   
 (B)  $2x^2$  (E)  $5x^6$   
 (C)  $x^3$

3. If  $6x - \frac{15}{x} > -1$ , which of the following is true?
- (A)  $x > -\frac{5}{3}$   
 (B)  $-\frac{5}{2} < x < \frac{3}{2}$   
 (C)  $\frac{-5}{2} < x < 0$  and  $x > \frac{3}{2}$   
 (D)  $x < \frac{-5}{2}$  and  $0 < x < 2$   
 (E)  $-3 < x < 2$
4. The equation  $x^4 - 14x^3 + 48x^2$  has how many distinct roots?
- (A) 4 (D) 1  
 (B) 3 (E) 0  
 (C) 2
5. Almonds cost \$4.00 per pound. Cashews cost \$5.00 per pound. What would be the price per pound of the assorted nuts, if the almonds and the cashews were taken in the ratio 3 : 5?
- (A) 3.80 (D) 6.5  
 (B) 4.625 (E) 7.5  
 (C) 5.75
6. A function  $(x)$  is defined as  $\frac{-1}{x}$  for all non-zero numbers. If  $\theta(a) = \frac{-1}{2}$  and  $\theta(ab) = \frac{1}{8}$ , what is the value of  $b$ ?
- (A) -16 (D) 4  
 (B) -4 (E) 8.  
 (C) 2
7. If  $\frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \dots + \frac{1}{512} + \frac{1}{1024} = \frac{x}{y}$ ; then  $y - x = ?$
- (A) 0 (D) 512  
 (B) 1 (E) 1023  
 (C) 128
8. 'X' is the product of all integers from 1 to 8. If  $X = 2^a \cdot 3^b \cdot 5^c \cdot 7^d$ , then  $a + b + c + d = ?$
- (A) 9 (D) 12  
 (B) 10 (E) 13  
 (C) 11
9. A certain airline rejects bags heavier than 44 pounds. If a bag weighing 32.7 pounds has to be rejected, then which of the following must be true?
- I. You can add not more than 11 pounds into the bag.  
 II. You can add more than 32.7 pounds into the bag.  
 III. You can add less than 13 pounds into the bag.
- (A) I only (D) II and III only  
 (B) II only (E) III only  
 (C) I & II only
10. 'a' is a positive integer and  $a^3 - 4a = 105$ . What is the value of  $\frac{a^4 - 16}{a^2 - 4} = ?$
- (A) 13 (D) 49  
 (B) 25 (E) 53  
 (C) 29

### Exercise No. 3

**Directions:** Write your answer to the given questions in the boxes provided. Questions that have correct answers in the integer or decimal form are provided with one box. Questions that have correct answers in the form of fractions have two boxes, one for the numerator and the other for the denominator.

1. The distance traveled by a rocket in ' $t$ ' seconds is given by  $h = 16t^2 + 20$ . What should be the minimum value of  $t$  (to the nearest integer), for the distance traveled by the rocket to be 200 more than the distance traveled in  $(t - 1)$  seconds?
- 
2. If  $a \neq 0$  and  $b \neq 0$  and  $a, b, c$  are different integers, the sum of the two-digit integers  $ab$  and  $ba$  is a three-digit number  $aac$ , then what is the value of  $\frac{b-a}{b+a}$ ?
-

3. An ice-skating rink charges \$6 for admission. It costs \$4 per day to rent the ice-skates and \$36 to buy them. What is the minimum number of times the ice-skates should be used in order to make the cost of buying the skates less than renting them?
4. A telephone bill includes a fixed charge of \$0.35 plus a charge of \$0.35 for the first 3 minutes of the call and an extra charge of \$0.18 per minute after the first 3 minutes. If Jane's recent telephone bill exceeds \$2, what is the minimum duration (in seconds) she was on the call? (Enter your answer, rounded to the nearest integer).
5.  $2x + 5y = 10$ ;  $kx - 3y = 12$ .  
 For what value of 'k', will the two equations have no unique solutions for x and y (Enter your answer correct to two decimal places).
6. Find the value of  $24^3 - 14^3$ .
7. The half-life period of an unstable isotope is the time taken for the substance to decay to half of the original amount. If, in one hour, 6.35% of the original amount of an unstable isotope is remaining, find the approximate half-life time of the isotope correct to the nearest minute.
8. The value of 'k' is given by a value which is 850% of  $1.8 \times 10^3$ . If  $k = x \times 10^4$ , then  $x = ?$
9. Runners x and y started an 18-mile race at the same time. Runner x completed the course in 6 hours, and runner y finished 2 hours earlier. How many miles per hour did runner y run faster than runner x?
10. A vending machine dispenses ten differently colored gumballs in a regularly repeating cycle. If 3 gumballs cost \$0.25 then, what is the minimum amount that must be spent before three gumballs of the same color are dispensed?

### Exercise No. 4

**Directions:** Compare Column A with Column B, using additional information if given. Select from one of the following four answer choices.

- A. Column A is greater.
- B. Column B is greater.
- C. The two columns are equal.
- D. The relationship cannot be determined from the information given.

- |  |   |
|--|---|
| <p>1. <math>0 &lt; x &lt; 1</math><br/> <b>Column A</b>                      <b>Column B</b><br/> <math>\left(\frac{x}{25}\right)^3</math>                              <math>\left(\frac{x}{125}\right)^2</math></p> <p>2. <math>4x + 3y = 12</math><br/> <math>x + 2y = 2</math><br/> <b>Column A</b>                      <b>Column B</b><br/> <math>\left \frac{x}{y}\right </math>                                  <math>\left(\frac{x}{y}\right)^2</math></p> | <p>3. <math>\{x + 2\} = 2  3x - 4 </math><br/> <b>Column A</b>                      <b>Column B</b><br/> <math>(x + 2)</math>                              <math>(3x - 4)</math></p> <p>4. a is a positive number<br/> <b>Column A</b>    <b>Column B</b><br/> <math>\frac{1}{a^2} [(a - d)(a)(a + d) + ad^2]</math>      a</p> |
|--|---|

5. 'x' is a positive integer and 'y' is a single-digit positive integer. The remainder, when  $y - 4x$  is divided by 7, is 2.
- |  |                 |
|--|-----------------|
| <b>Column A</b>                              | <b>Column B</b> |
| The remainder when $10x + y$ is divided by 7 | 2               |
6.  $xy \neq 0$ ;  $\frac{|xy|}{y} = \frac{2|x|}{xy}$
- |                 |                 |
|-----------------|-----------------|
| <b>Column A</b> | <b>Column B</b> |
| $\frac{ x }{y}$ | $\frac{x}{ y }$ |
7. 'x' is square root of squares of all the integers greater than  $-15$  and less than  $15$
- |                 |                 |
|-----------------|-----------------|
| <b>Column A</b> | <b>Column B</b> |
| $14x - 60$      | $5x + 75$       |
8.  $(2x - 1)(x + 2)(x + 3)$
- |                      |                    |
|----------------------|--------------------|
| <b>Column A</b>      | <b>Column B</b>    |
| Coefficient of $x^2$ | Coefficient of $x$ |
9. **Column A**  $x^2 + 1$  **Column B**  $2x - 1$
10.  $a^x = b^y$ , where 'a' and 'b' are distinct prime numbers
- |                 |                 |
|-----------------|-----------------|
| <b>Column A</b> | <b>Column B</b> |
| $x + y$         | 1               |

### Exercise No. 5

**Directions for Questions 1–5:** Select the correct option from the choices that follow the question.

1. 'x' is the sum of five consecutive integers. In terms of  $x$ , what is the difference between thrice the greatest integer and twice the smallest integer?
- (A)  $5 - 0.2x$  (D)  $0.2x + 10$   
 (B)  $0.2x + 2$  (E)  $0.2x + 13$   
 (C)  $0.2x + 5$
2. In a poll,  $x\%$  said that they would vote for a particular proposition. Of these,  $y\%$  actually voted for it.  $z\%$  of those who did not say that they would vote for the proposition actually voted for the proposition. What percentage of those who polled, voted for the proposition?
- (A)  $z + \frac{x(y-z)}{100}$  (D)  $100 + z - \frac{xy}{100}$   
 (B)  $x - \frac{y(z-x)}{100}$  (E)  $\frac{100z - x(y-z)}{100}$   
 (C)  $100 - x + \frac{yz}{100}$
3. If  $x$  and  $y$  are two numbers on the number line and  $y^2 < 100$  and  $\frac{-1}{3} < x < \frac{2}{3}$  then, which of the following must be true?
- (A)  $xy < 6$  (D)  $x + y < 10.3$   
 (B)  $y - x < 10$  (E)  $\frac{-28}{3} < x + y < \frac{21}{3}$   
 (C)  $-11 < y - x < 11$
4. A store sells 25 hamburgers on the first day of its business. Every day thereafter, it sells 5 more hamburgers than the day before. If this trend continues for a month, then what is the number of hamburgers sold on the 31st day?
- (A) 160 (D) 205  
 (B) 175 (E) 220  
 (C) 190
5. If  $a = \frac{b}{2}$  and  $b = \frac{c}{2}$  then  $\sqrt{\frac{a}{c}} =$
- (A) 4 (D)  $\frac{1}{2}$   
 (B) 2 (E)  $\frac{1}{4}$   
 (C) 1
- Directions for Questions 6–10:** Compare Column A with Column B, using the additional information, if given. Select from one of the following four answer choices.
- A. Column A is greater.  
 B. Column B is greater.  
 C. The two columns are equal.  
 D. The relationship cannot be determined from the information given.

6.  $x = \sqrt{36}$  and  $y^2 = 36$

**Column A** $x$ **Column B** $y$ 

7.  $x^2 = 49$ ,  $|y| = 7$

**Column A** $x$ **Column B** $y$ 

8. If  $x^{a+5} = y^{b+3}$ , wherein  $a$ ,  $b$  are integers, and  $x$ ,  $y$  are distinct prime numbers

**Column A** $a \cdot b$ **Column B**

15

9. **Column A** $300030 \times 30300$ **Column B** $3003000 \times 30030$ 10. A two-digit number ( $k$ ) is a multiple of 7 and 7 times this number has 7 in its unit's place.**Column A** $k$ **Column B**

49

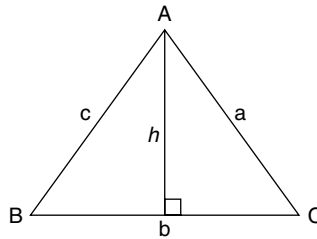


# CHAPTER 20

## Geometry

### Formulae Cheat Sheet

#### 1. Properties of triangles



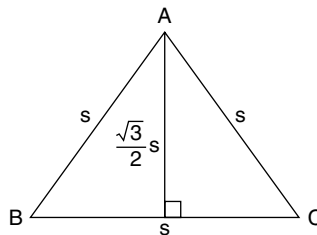
(a) Sum of all the angles:  $\angle A + \angle B + \angle C = 180^\circ$ .

(b) Perimeter ( $P$ ) of a triangle =  $a + b + c$ , where  $a$ ,  $b$ , and  $c$  are the sides of the triangle.

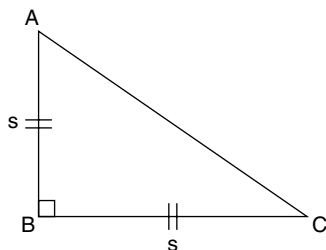
(c) Area ( $A$ ) of a triangle:  $A = \frac{1}{2}bh$ , where  $b$  = base, and  $h$  = height.

Heron's (or Hero's) Formula for area of a triangle =  $\sqrt{s(s-a)(s-b)(s-c)}$ , where  $s = \frac{a+b+c}{2}$  ( $s$  is half of the perimeter).

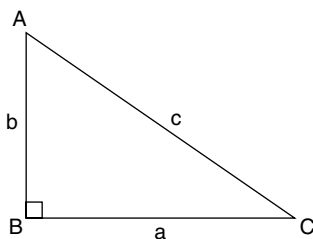
(d) Area of an equilateral triangle =  $\frac{\sqrt{3}}{4}S^2$ , where  $s$  is the side of the triangle, and height of an equilateral triangle =  $\frac{\sqrt{3}}{2}S$ .



- (e) Area of a right-angled isosceles triangle =  $\frac{1}{2}(S)^2$ , where  $s$  is side other than the hypotenuse, where  $AC = s\sqrt{2}$ .



- (f) The relationship among the sides of a triangle:  $a + b > c$ ,  $a + c > b$ , and  $b + c > a$ .
- (g) The Pythagorean theorem is valid only for right angled triangles. Lengths of the sides of a right-angled triangle can be found by using the Pythagorean formula:  $a^2 + b^2 = c^2$ , where  $a$  and  $b$  are the sides, and  $c$  is the hypotenuse.



2. Quadrilaterals ( $l$  = length,  $w$  = width,  $b$  = base,  $h$  = height;  $a$ ,  $b$ ,  $c$ , and  $d$  are the sides)

(a) Square

- (i) Area ( $A$ ) =  $l^2$ .                      (ii) Perimeter ( $P$ ) =  $4l$ .                      (iii) Diagonal =  $\sqrt{2}l$ .

(b) Rectangle

- (i) Area ( $A$ ) =  $lw$ .                      (ii) Perimeter ( $P$ ) =  $2l + 2w$ .                      (iii) Diagonal =  $\sqrt{l^2 + w^2}$ .

(c) Parallelogram

- (i) Area ( $A$ ) =  $lh$ .                      (ii) Perimeter ( $P$ ) =  $2l + 2w$ .

(d) Rhombus

- (i) Area ( $A$ ) =  $\frac{1}{2}(d_1 \times d_2)$  ( $d_1$  and  $d_2$  are the diagonals).                      (ii) Perimeter ( $P$ ) =  $4l$ .

(e) Trapezoid ( $AmE$ )\*, Trapezium ( $BrE$ )\*

- (i) Area ( $A$ ) =  $\frac{1}{2}(a + c)h$  ( $a$  and  $c$  are the parallel sides,  $h$  = distance between the parallel sides).

- (ii) Perimeter ( $P$ ) =  $a + b + c + d$ .

3. Polygons: (a) Sum of all the interior angles in a polygon:  $(n - 2) \times 180^\circ$ .

- (b) Measure of each interior angle in a regular polygon =  $\frac{n-2}{n} \times 180^\circ$ , where  $n$  = number of sides.

4. Circles ( $r$  = radius,  $d$  = diameter,  $\alpha$  = angle subtended).

(a) Area,  $(A) = \pi r^2 \left( \pi \sim \frac{22}{7} \right)$ .

(b) Circumference,  $C = 2\pi r = \pi d$  ( $d = 2r$ ).

5. Sector

(a) Relationship between arc and central angle,  $\frac{l}{2\pi r} = \frac{\alpha}{360^\circ}$ .

(b) Area of the sector,  $\frac{\alpha}{360^\circ} \pi r^2 = \frac{lr}{2}$ .

(c) Perimeter of a sector,  $l + 2r = l + d$ .

(d) Length of the Arc,  $l = \frac{\alpha}{360} \times 2\pi r$ .

6. Rectangular Solid (Cuboid)

(i) Volume,  $v = lbh$ .

(iii) Diagonal,  $D = \sqrt{l^2 + b^2 + h^2}$ .

(ii) Surface area,  $A = 2lb + 2lh + 2bh$ .

7. Cube

(i) Volume,  $V = l^3$ .

(ii) Surface area,  $A = 6l^2$ .

(iii) Diagonal,  $D = \sqrt{3}l$ .

8. Sphere

(i) Volume,  $V = \frac{4}{3} \pi r^3$ .

(ii) Surface area,  $A = 4\pi r^2$ .

9. Cylinder

(i) Volume,  $V = \pi r^2 h$ .

(ii) Surface area,  $A = 2\pi r h + n\pi r^2$  ( $n = 0, 1, 2$ ).

10. The distance ' $d$ ' between any two points  $P(x_1, y_1)$ , and  $Q(x_2, y_2)$  in the rectangular coordinate system is

$$\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}.$$

11. Equation of a line:

(a) General form:  $ax + by + c = 0$

$a = x$  - coefficient, and  $b = y$  - coefficient; slope ' $m$ ' =  $\frac{-a}{b}$ .

(b) Intercept form,  $\frac{x}{a} + \frac{y}{b} = 1$

' $b$ ':  $y$  intercept, it is the point at which a line crosses the  $y$  axis.

' $a$ ':  $x$  intercept, it is the point at which a line crosses the  $x$  axis.

slope ' $m$ ' =  $\frac{-b}{a}$ .

(c) Slope form,  $y = mx + b$ , where  $m$  is the slope and  $b$  is the  $y$ -intercept.

(i) Slope,  $m = \frac{y_2 - y_1}{x_2 - x_1}$

(ii)  $y$ -intercept =  $b$

(iii)  $x$ -intercept (a) =  $-b/m$

## Basic Concepts in Geometry

**Plane geometry** deals with lines, angles, triangles, quadrilaterals, polygons, circles and their properties, sectors, and mixed figures.

**Solid geometry** deals with regular and irregular solids like cube, cuboid, cylinder, sphere, cone, pyramid, prism, and mixed figures.

**Coordinate geometry** deals with equations of lines, slopes, intercepts, inequality of equations and special conditions, curves, reflections, and graphs of functions.

Problems on geometry are fundamentally different from problems on algebra.

In algebra, a process-driven approach is used to solve problems. In geometry, an information-driven approach is used. In problems on geometry, much of the information is not given; instead, inferences should be made. It is very important to understand the terms commonly used in the *GRE*<sup>®</sup>, some of which are listed below:

- (a) *Angles*: Right, straight, acute/obtuse, vertical, complementary, and supplementary angles.
- (b) *Lines*: Parallel lines crossed by transversal(s).
- (c) *Triangles*: Right, isosceles, equilateral, and scalene triangles.
- (d) *Quadrilaterals*: Parallelogram, rhombus, rectangle, square, trapezoid, and irregular quadrilaterals.
- (e) *Polygons*: Regular and irregular polygons.
- (f) *Circles*: Semicircle, sector, arc, chord, tangent.
- (g) *Solids*: Prism pyramids, and sphere.
- (h) *Lines and curves*: Equations, slopes, intercepts, intersects, and quadrants.
- (i) *Graphs of functions*: Lines, curves, linear, and quadratic expressions.



### Tips

Questions on geometry do not ask you to prove theorems.

## Properties of Angles

Given two intersecting lines or line segments, the amount of rotation about the point of intersection (the vertex) required to bring one line into correspondence with the other line is the angle between them. Based on the measure of the angle between the lines, angles are categorized into different types.

Acute angle	:	$0^\circ < \text{Angle} < 90^\circ$
Right angle	:	$\text{Angle} = 90^\circ$
Obtuse angle	:	$90^\circ < \text{Angle} < 180^\circ$
Straight angle	:	$\text{Angle} = 180^\circ$
Reflex angle	:	$180^\circ < \text{Angle} < 360^\circ$
Complete angle	:	$360^\circ$

**Intersecting lines:** Lines '*l*' and '*m*' intersect at '*O*'.

- (i)  $x = y$  and  $a = b$  (vertically opposite angles).
- (ii)  $a + x = b + y = 180^\circ$  (angle on a straight line).



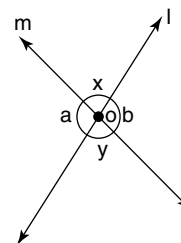
### Tips

Two lines are perpendicular to each other if the angle between them is  $90^\circ$ .



### Tips

Angle of a point is  $360^\circ$ .



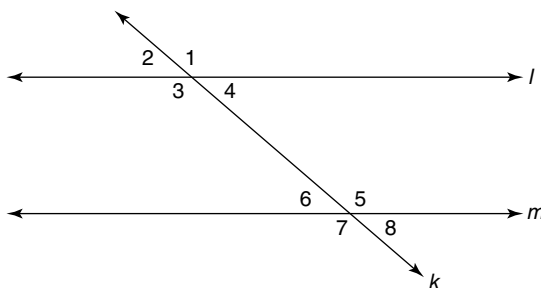
Two angles  $x$  and  $y$  are called complementary if  $\angle x + \angle y = 90^\circ$ .

Two angles  $x$  and  $y$  are called supplementary if  $\angle x + \angle y = 180^\circ$ .

### Parallel Lines

The figure below shows a line intersecting two parallel lines, forming vertical angles, alternate interior angles and alternate exterior angles.

To prove that two lines  $l$  and  $m$  are parallel draw an intersecting line ( $k$ ) called a transversal, which forms 8 angles as shown in the figure.



The lines  $l$  and  $m$  are said to be parallel if it satisfies any one of the following properties.

1. In the figure above if one angle is  $90^\circ$  all the other angles must be  $90^\circ$ .
2. All the small angles ( $\angle 2, \angle 4, \angle 6, \angle 8$ ) are equal.
3. All the big angles ( $\angle 1, \angle 3, \angle 5, \angle 7$ ) are equal.
4. Any pair consisting of a small angle and a big angle is supplementary.

*Example:* Line  $l$  and  $m$  are parallel

Column A	Column B
$AB$	$BC$

- Column A is greater.*
- Column B is greater.*
- The two columns are equal.*
- The relationship cannot be uniquely determined from the information given.*

*Solution:* In the figure  $\angle BAC$  and  $\angle BCA$  appears like as if they are equal.

If  $\angle BAC = \angle BCA$ ;  $AB = BC$  and Column  $A =$  Column  $B$ .

If  $\angle BAC > \angle BCA$ ;  $AB < BC$  and Column  $A <$  Column  $B$ .

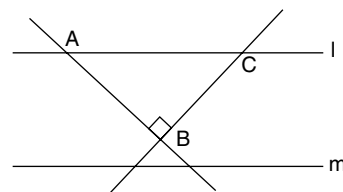
So, we cannot determine the answer from the information given.

Hence, the correct answer is  $D$ .



#### Tips

The ability to identify the properties of angles is critical, particularly in quantitative comparison questions.



## Triangles

A triangle is a shape formed by connecting the points of intersection of three mutually non-parallel lines.

The perimeter ' $P$ ' of a triangle is the sum of the lengths of the sides ( $a + b + c$ ) and the area ' $A$ ' is  $\frac{1}{2}bh$ , where  $b$  is the base and  $h$  is the perpendicular distance from the base to the opposite vertex.

1. The sum of the measures of the three interior angles of a triangle is  $180^\circ$ .
2. The angles are a representation of the corresponding opposite sides. If two sides of a triangle are equal, then their corresponding opposite angles are also equal.
3. The sum of the lengths of any two sides of a triangle is always more than the third side. The difference between the lengths of any two sides of the triangle is always less than the third side.

The value of the length of each side lies between the value of the difference between the lengths of the other two sides and the value of the sum of the lengths of the other two sides.

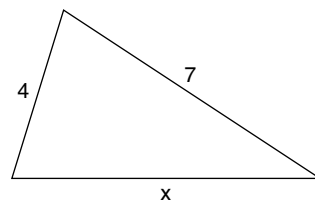
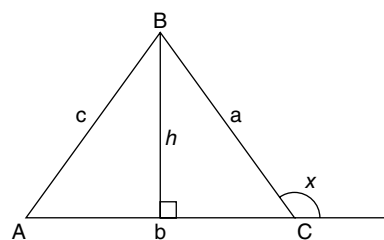
For example, in the above figure,  $|a - c| < b < a + c$ .

*Example:* If 4, 7, and  $x$  are three sides of a triangle, what is the value of  $x$ ?

*Solution:*

$7 - 4$	$<$	$x$	$<$	$7 + 4$
Difference	$<$	Third side	$<$	Sum of the sides
That is, 3	$<$	$x$	$<$	11

Hence, the third side  $x$  can take any value between 3 and 11.



### Tips

An exterior angle is equal to the sum of the interior opposite angles.

## Types of Triangles

There are three types of triangles:

1. Acute-angled triangle (the largest angle has a measure less than  $90^\circ$ ).
2. Obtuse-angled triangle (the largest angle has a measure greater than  $90^\circ$ ).
3. Right-angled triangle (the largest angle measures exactly  $90^\circ$ ).

The triangles are further classified as isosceles, equilateral, and right-angled triangles.

### Isosceles Triangles

A triangle which has (at least) two equal sides is called an isosceles triangle. In an isosceles triangle the corresponding angles of the equal sides are also equal in measure.

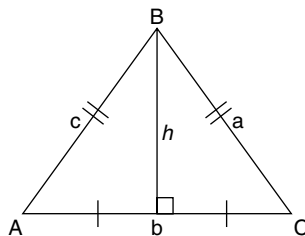


### Tips

Given that  $a$ ,  $b$ , and  $c$  denote the sides, then the triangle is:

- (i) Acute angled, if  $c^2 < a^2 + b^2$ .
- (ii) Right angled, if  $c^2 = a^2 + b^2$ .
- (iii) Obtuse angled, if  $c^2 > a^2 + b^2$ .

In a triangle, the sum of two sides is always greater than the third side.

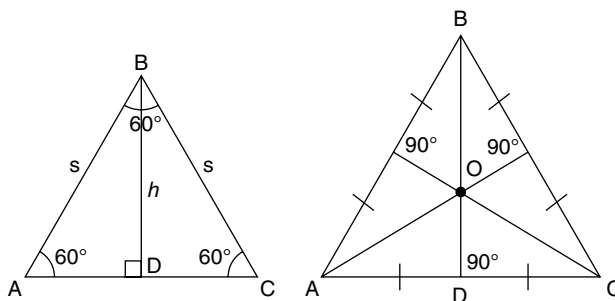


Isosceles triangle  $ABC$  ( $AB = BC$ ), and  $\angle BAC = \angle BCA$

One of the special properties of an isosceles triangle is, when, from the vertex of the sides of equal length, a perpendicular is dropped to the third side, two equal right-triangles are formed.

### Equilateral Triangles

A triangle which has all the sides and all the angles equal is called an equilateral triangle. The perimeter and the area of the equilateral triangle are  $3a$  and  $\frac{\sqrt{3}}{4}a^2$  respectively, where the altitude (height) is  $\frac{\sqrt{3}}{2}a$ .

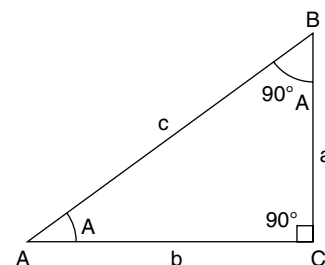


The center 'O' bifurcates the altitude ( $h$ ) in the ratio of 2 : 1. That is,  $BO : OD = 2 : 1$

### Right-angled Triangle

If the greatest angle in a triangle is  $90^\circ$ , it is called a right-angled triangle. The side opposite to  $90^\circ$  is called the hypotenuse. In a right-angled triangle, if the two adjacent sides are equal, the triangle is a right-angled isosceles triangle.

The area of a right-angled isosceles triangle =  $\frac{1}{2}$  (side)<sup>2</sup>, (side other than hypotenuse).



#### Tips

An equilateral triangle has the maximum area for a given perimeter.

### The Pythagorean Theorem

In a right-angled triangle, where  $a$ ,  $b$ , and  $c$  represent the sides of the triangle and side  $c$  is opposite to the  $90^\circ$  angle, the square of the hypotenuse is equal to the sum of the squares of the other two sides.

$$a^2 + b^2 = c^2$$

The Pythagorean theorem has important applications.

1. If the length of a rectangular box is  $l$  and width is  $w$ , the diagonal across the box  $= \sqrt{l^2 + w^2}$ .
2. The length of the diagonal formed by a cuboid of length ( $l$ ), width ( $w$ ), and height ( $h$ )  $= \sqrt{l^2 + w^2 + h^2}$ .

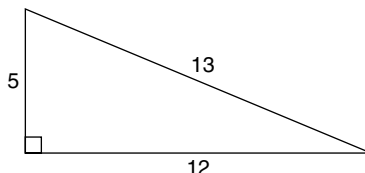
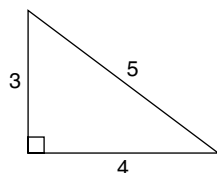
Most of the problems on geometry involve right-angled triangles that require the application of Pythagorean triplets. Pythagorean triplets refer to the right-angled triangles with ratio of sides as follows:

(1) 3 : 4 : 5

(2) 5 : 12 : 13

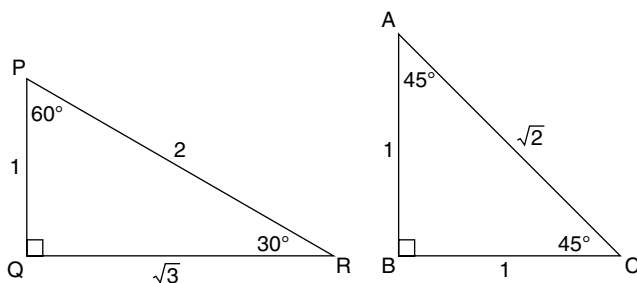
(3) 8 : 15 : 17

(4) 7 : 24 : 25



The angles of special right-angled triangles are  $30^\circ : 60^\circ : 90^\circ$  and  $45^\circ : 45^\circ : 90^\circ$ .

**Note:** Angles ratio  $30^\circ : 60^\circ : 90^\circ$  &  $45^\circ : 45^\circ : 90^\circ$   
 Sides ratio  $1x : \sqrt{3}x : 2x$  &  $1x : 1x : \sqrt{2}x$



### Scalene Triangle

Scalene triangles have no equal angles or sides. The formula for determining the area  $A$  of any triangle with sides of length  $a$ ,  $b$ , and  $c$  (Heron's formula) is

$$A = \sqrt{s(s-a)(s-b)(s-c)}$$

where

$$s = \frac{a+b+c}{2}$$



#### Tips

Altitude is a perpendicular drawn from a vertex of a triangle to the opposite side.

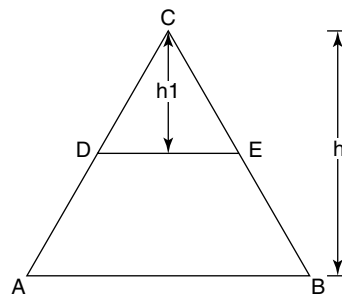
### Similar Triangles

Two triangles are said to be similar, if

- both the triangles have the same measure for each angle.
- the lengths of sides are in proportion.

**Exp:** In the given figure, if  $ABC$  and  $DEC$  are two similar isosceles triangles,

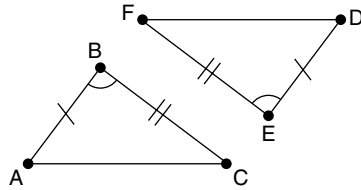
where  $DE$  is parallel to  $AB$ , then  $\frac{DE}{AB} = \frac{h_1}{h}$ .





### Congruent Triangles

Two triangles are said to be congruent triangles, if their corresponding angles and sides are equal.



#### Tips

Congruent triangles are similar but similar triangles need not be congruent.

### Relation Between Angles and Sides of a Triangle

A greater angle corresponds to a greater side and a smaller angle corresponds to a smaller side.

If  $\angle B > \angle C > \angle A > b > c > a$

*Example:* In the figure, if  $\triangle ABC$  and  $\triangle ADE$  are similar triangles then  $x = ?$

*Solution:* Since  $\triangle ABC$  and  $\triangle ADE$  are similar triangles.

$$\frac{DE}{BC} = \frac{AD}{AB} \Rightarrow \frac{x}{8} = \frac{4}{7} \Rightarrow x = \frac{32}{7} m$$

*Example:* If 5,  $k$ , 9 are three sides of a triangle, then what could be the possible value of the side ' $k$ ' (indicate all possible answers).

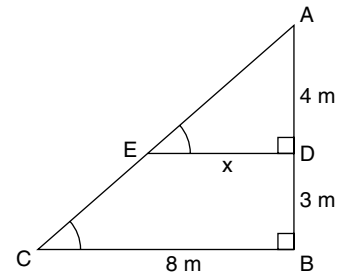
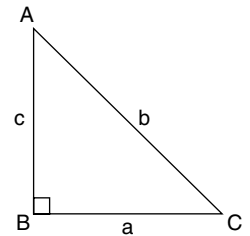
*Solution:* Since each side lies between difference between other two sides and sum of other two sides,  $9 - 5 < k < 9 + 5$ .

That is  $4 < k < 14$  therefore, the third side ' $k$ ' takes all the values between 4 and 14.

*Example:* A man started from city  $A$  and walked 7 miles east to city  $B$ , from there he walked 24 miles north to city  $C$ . What is the shortest distance that he can travel from city  $A$  to city  $C$  without crossing city  $B$ ?

*Solution:* The given information is of a right-angled triangle with two adjacent sides 7 and 24. The shortest distance that the man traveled is the hypotenuse of the right-angled triangle.

Hence, the shortest distance is  $\sqrt{7^2 + 24^2} = 25$  miles.



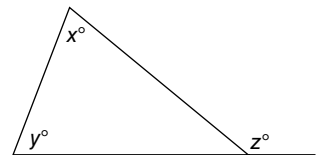
#### Tips

The Median is the line that joins the vertex to the mid-point of the opposite side. A median bisects the area of the triangle.

The centroid divides each median from the vertex in the ratio 2 : 1.


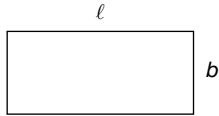
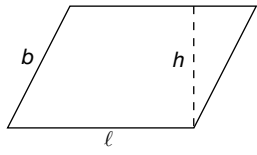
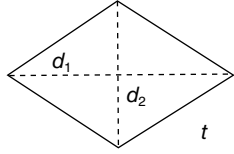
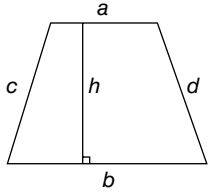
### Practice Questions

- In the figure, if  $x = 30$  and  $y = 80$ , then  $z = ?$
- The lengths of two sides of an isosceles triangle are 8 and 15, respectively. What is the difference between the maximum perimeter and the minimum perimeter of the triangle?
- If the height of an equilateral triangle is 15 units, then what is the area of the triangle?



### Quadrilaterals

A closed figure with four sides and four angles is called a quadrilateral. A rectangular quadrilateral is called a square. In the GRE® most of the questions on quadrilaterals are tested with mixed figures and their properties.

Figure	Name	Perimeter	Area	Features
 <p style="text-align: center;"><math>\ell</math></p>	Square	$4\ell$	$\ell^2$	All sides are equal. Opposite sides are parallel to each other. Each angle is equal to $90^\circ$ . Diagonal ( $D$ ) = $\ell \sqrt{2}$
	Rectangle	$2\ell + 2b$	$\ell b$	Opposite sides are equal and parallel. Each angle is equal to $90^\circ$ .
	Parallelogram	$2\ell + 2b$	$\ell h$ $h = \text{height}$ $\ell = \text{base}$	Opposite sides are equal and parallel. Opposite angles are equal.
	Rhombus	$4\ell$	$\frac{1}{2} (d_1 \times d_2)$	All sides are equal. Opposite angles are equal. Diagonals are perpendicular to each other.
	Trapezoid	$a + b + c + d$	$\frac{1}{2} (a + d)h$	One pair ( $a$ and $b$ ) of the sides are parallel.

### Properties of Quadrilaterals

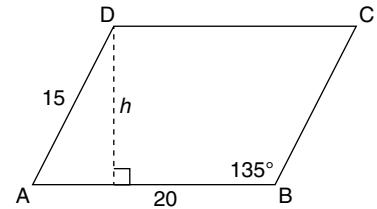
For a square, a rectangle, a parallelogram, and a rhombus, the following properties are common:

1. Opposite sides are parallel and equal.
2. Opposite angles are equal.
3. Pair of adjacent angles are supplementary ( $180^\circ$ ).
4. Diagonals bisect each other.

Example:  $ABCD$  is a parallelogram

**Column A**      **Column B**  
300                  Area of the figure  $ABCD$

- A. Column A is greater.  
B. Column B is greater.  
C. The two columns are equal.  
D. The relationship cannot be determined from the information given.



Solution: If a parallelogram is in the shape of a rectangle, it takes the maximum area

$$(\text{base} \times \text{height} = 20 \times 15 = 300)$$

Since  $\angle ABC = 135^\circ$  Area of the parallelogram

$$(\text{base} \times \text{height} = 20 \times h) < 300.$$

Hence, Column A > Column B.

The correct answer is A.



### Tips

A rectangle is a parallelogram but a parallelogram need not be a rectangle.

Example: If the area of a rhombus with one diagonal 10 units long is 120 square units, then what is the perimeter of the rhombus?

Solution: Let  $ABCD$  be the rhombus with diagonals  $AC$  and  $BD$ .  $I$  is the point of intersection of the diagonals  $AC$  and  $BD$ .

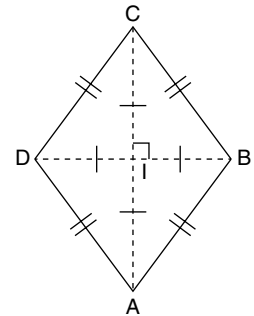
$$\text{The area of the rhombus} = \frac{1}{2}d_1 \times d_2 = 120.$$

Given one diagonal is 10 (say  $BD$ ). Hence, the other diagonal is 24 (say  $AC$ ).

$\therefore CI = 12$  and  $DI = 5$  (since  $BD$  and  $CA$  are perpendicular bisectors).

In the figure  $DIC$  is a right-angled triangle with sides 5 and 12. Hence,  $CD = 13$ .

$\therefore$  The perimeter of the rhombus is  $4 \times 13 = 52$  units.



## Polygons

A closed figure with many angles is called a polygon. On the  $GRE$ ® the questions on polygons are asked on regular polygons and irregular polygons, unless mentioned, the polygon by default is irregular.

In a polygon with 'n' sides:

- (I) Sum of all the interior angles of any polygon  $= (n - 2) \times 180^\circ$ .  
(II) Sum of all the exterior angles of any polygon  $= 360^\circ$ .  
(III) Number of diagonals from one vertex in a polygon  $= (n - 3)$ .  
(IV) Number of diagonals in a polygon  $= \frac{n(n-3)}{2}$ .



### Tips

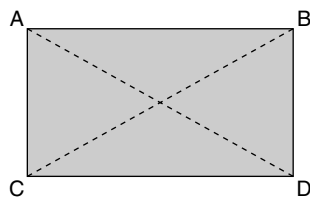
Polygons with 5, 6, 7, 8, 9, and 10 sides are called pentagon, hexagon, septagon, octagon, nonagon, and decagon, respectively.

## Regular Polygons

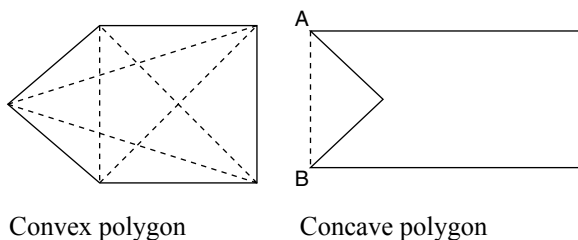
Polygons that have all angles and all sides equal are called regular polygons.

- (I) Each interior angle of a regular polygon  $= \frac{(n-2) \times 180^\circ}{n}$ .  
(II) Each exterior angle of a regular polygon  $= \frac{360^\circ}{n}$ .

A diagonal of a polygon is a line segment that connects a vertex to the opposite vertex.



A convex polygon has all the diagonals within the figure. In other words, if you choose any two vertices and draw a line between them, the line will be entirely within the figure.



Convex polygon

Concave polygon

A concave polygon has at least one of the diagonals outside the figure.



**Tips**

Circumference of a circle  $C = 2\pi r$  or  $C = \pi d$  where 'r' is the radius and 'd' is the diameter.

### Circles

**Circle:** A set of points in a single plane that is equidistant from a particular point. This particular point is the center of the circle and is called the origin of the circle.

**Radius (r):** The length of the line segment drawn from the origin to any point on the circle.

**Diameter (d):** A line segment joining any two points on the circle and passing through the centre of the circle.

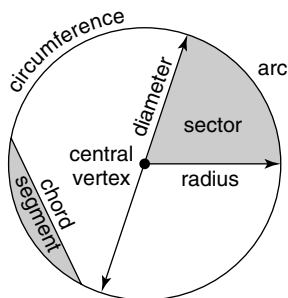
**Chord:** A line segment joining any two points on the circle. A diameter is the longest chord that passes through the center of the circle and has its end point on the circle.

**Arc:** A part of the outer boundary of a circle between two particular points.

**Tangent:** A line that touches the outer boundary of a circle at a single point.

**Circumference:** The complete outer boundary of a circle. The circumference of a circle can be calculated by using a formula,  $2\pi r = \pi d$ .

The area of a circle can be calculated by using the formula,  $\pi r^2 = \frac{\pi d^2}{4}$ .



### Properties of Circles

- The diameter of a circle is the longest chord in the circle. The diameter is represented by 'd' and 'd' = '2r', where 'r' is the radius of the circle.
- A line drawn from the center of a circle to a chord will always be perpendicular to the chord.
- The angle subtended by the diameter on any point of a circle is 90°. In other words, if a right-angled triangle is inscribed in a circle, the hypotenuse is the diameter of the circle.
- For a given perimeter, the circle has the largest area.
- A circle has an angle of 360°.
- The angle measure of an arc is the angle subtended by the arc at the origin.
- The ratio of the length of an arc to the circumference of the circle is equal to the ratio of the angle subtended by the arc at the origin to the complete angle (= 360°).
- The ratio of the area of a sector to the area of the circle is equal to the ratio of the angle subtended by the arc at the origin to the complete angle (= 360°).



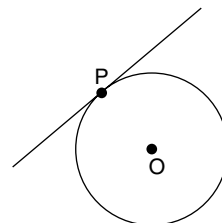
#### Tips

A line segment joining any two points on a circle is a chord.

In a plane, if a set of points equidistant from a given point are joined, a circle will be formed.

### Tangent

A tangent is a line that touches the circle externally at a single point. A tangent is always perpendicular to the radius at that point.



### Sector

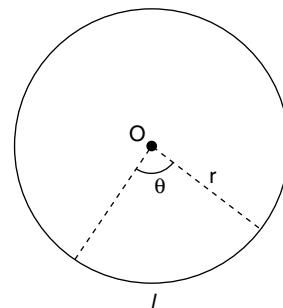
The sector is a portion between two radii and an arc of the circle.

$$\frac{\text{Length of an arc}}{\text{Circumference of a circle}} = \frac{\theta}{360} = \frac{\text{Area of the sector}}{\text{Area of the circle}}$$

$$\frac{l}{2\pi r} = \frac{\theta}{360^\circ} = \frac{\text{Area of the sector}}{\pi r^2}$$

$$\text{length of the arc} = \frac{\theta}{360} \times 2\pi r$$

$$\text{Area of the sector} = \frac{\theta}{360} \times \pi r^2$$



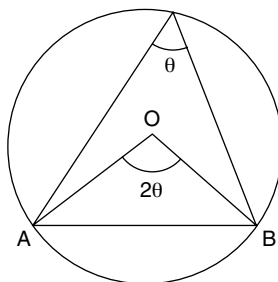
### Important Points to Remember

1. The angle made by an arc at the centre of the circle (central angle) is twice the angle made by an arc on the circle (inscribed angle).



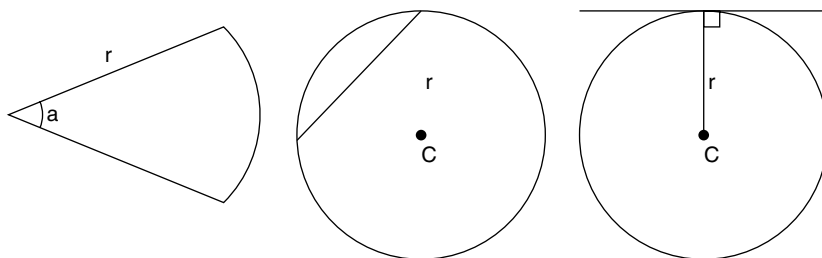
#### Tips

If two circles touch internally at one point, then there can be only one common tangent.

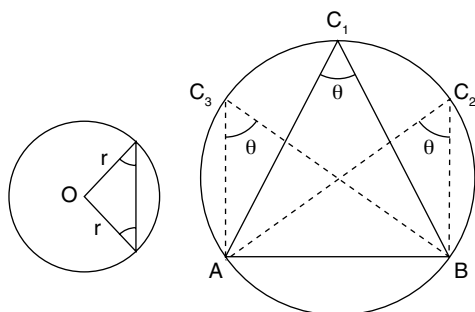


$$\text{Inscribed angle} = \frac{1}{2} \times \text{Central angle}$$

2. A tangent is always perpendicular to the radius of the circle drawn from the point of intersection of the tangent.



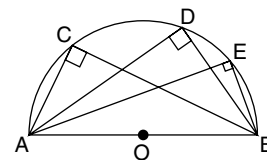
Any triangle formed by joining the ends of two radii will always be an isosceles triangle.



**Tips**  
Any line drawn within a circle cannot be longer than the diameter.

If a chord is at an angle  $\theta$  from a point on the circle, it will be at the same angle on any other point on the circle, if the point is in the same semi-circle.

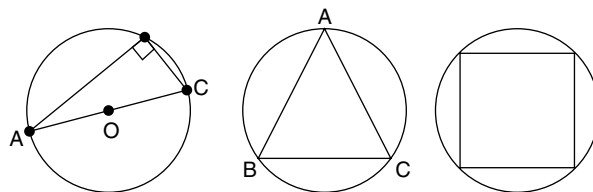
The angle inscribed in a semi-circle is a right-angle (or) the diameter is at an angle of  $90^\circ$  at any point on the circle.



**Note:**

1. Do not simplify ' $\pi$ ' as most options in geometry on the GRE® test are given in terms of  $\pi$ .
2. The total measure of the angle at the center of the circle is  $360^\circ$ .

**Polygon Inscribed in Circles**

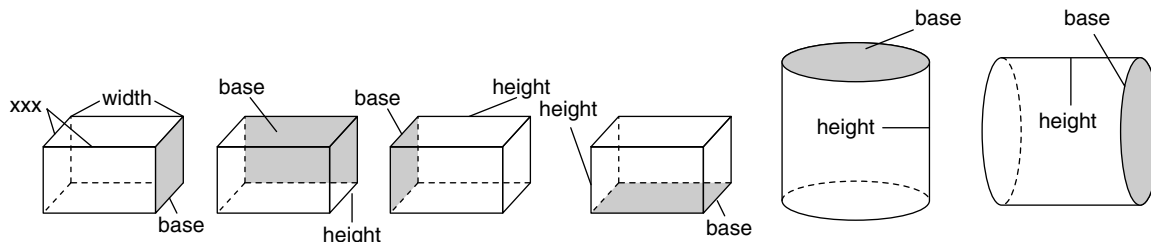


If a triangle is inscribed in a circle with the diameter as one of the sides of the triangle, then, the triangle is a right-angled triangle. The triangle with the largest area that can be inscribed in a circle is an equilateral triangle. If a square is inscribed in a circle, then the diagonal of the square is equal to the diameter of the circle. The quadrilateral with the largest area that can be inscribed in a circle is a square.



**Tips**  
Sum of the opposite angles in a cyclic quadrilateral is  $180^\circ$ . Hence, they are called supplementary angles.

## Three-dimensional Figures



3D-geometry primarily deals with volume and surface area of different 3D-figures. The common questions on 3D-figures that appear on the test are on cube, cuboid, cylinder, and sphere.

### Cuboid

A cuboid is a rectangular solid formed by six faces. The sides of these faces are the edges of the cuboid. Length, breadth and height are represented by ' $l$ ', ' $b$ ' and ' $h$ ' and the diagonal of the cuboid is represented by ' $d$ '.

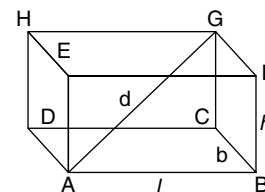


#### Tips

Diagonal of a cuboid  $\sqrt{l^2 + b^2 + h^2}$ .

The volume of a cuboid is  $V = lbh$ , and

The total surface area is  $A = 2lb + 2lh + 2hb$ .

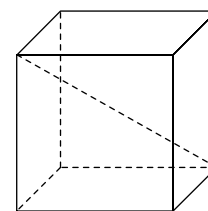


### Cube

A cube is a solid in which all the faces and sides are equal.

That is, length = breadth = height = ' $l$ '; diagonal =  $\sqrt{3} \times l$

Volume of the cube is ' $V$ ' =  $l^3$ . The surface area of the cube =  $6l^2$ .



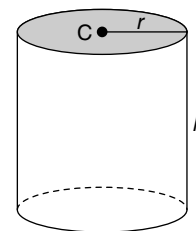
### Cylinder

The volume of a cylinder is  $V = \pi r^2 h$ ; the surface area depends upon whether the cylinder has a top, bottom, both or neither. The surface area is  $A = 2\pi r h + n\pi r^2$ , where  $n$  is the number of circular faces on the cylinder.

If  $n = 0$ , the cylinder is similar to a pipe.

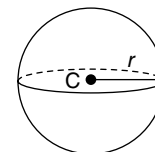
If  $n = 1$ , the cylinder is similar to an open cylinder.

If  $n = 2$ , the cylinder is similar to a solid cylinder.



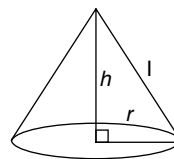
### Sphere

The volume ' $V$ ' of the sphere =  $\frac{4}{3}\pi r^3$  and the surface area ' $A$ ' is =  $4\pi r^2$ .



**Cone**

A cone has a circular base and a vertex that is not on the base. Cones have just one base and they converge at a point called the vertex.



Volume

$$V = \frac{1}{3}\pi r^2 h$$

Total Surface Area: Area of the base + area of the curved surface area  $\pi r(r + l)$



**Tips**

The volume of a sphere is equal to surface area of the sphere, if the radius  $r = 3$ .

**Properties of Similar Figures**

For similar figures, regardless of the shape (regular or irregular), the following properties hold true:

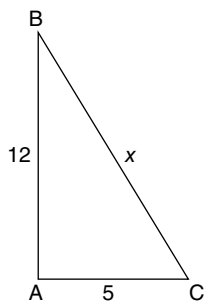
1. Any two corresponding lengths are in the same ratio.
2. Corresponding areas are in proportion to the square of the ratio of the corresponding sides.
3. Corresponding volumes are in proportion to the cube of the ratio of the corresponding sides.

**PRACTICE EXERCISES**

**Exercise No. 1**

**Directions:** Select all the options that are correct as per the information given in each question. Remember that one or more options may be correct.

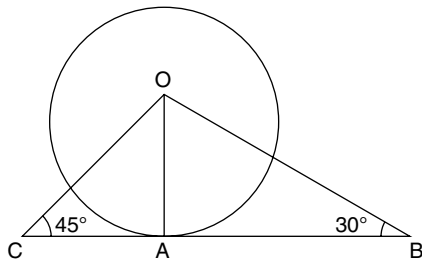
1. A ladder of length 26 units is inclined on a wall of length 24 units. The foot of the ladder started skidding and then rested at a height of 13 units on the wall. What is the change in the distance of the ladder from the wall? (Indicate all such answers).  
 (A) 9      (C) 11      (E) 13      (G) 15  
 (B) 10      (D) 12      (F) 14
2. In the triangle  $ABC$ , what is the length of the side  $BC$ ? (Indicate all possible answers).



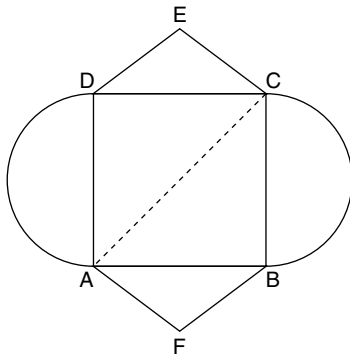
- (A) 7      (C) 13      (E) 17      (G) 24  
 (B) 8      (D) 16      (F) 21
3. The lengths of arcs of two sectors are in the ratio 2 : 1 and their areas are in the ratio 1 : 2. What is the ratio of the diameters of the two sectors? (Indicate all such answers).  
 (A) 1 : 5      (C) 1 : 3      (E) 1 : 1  
 (B) 1 : 4      (D) 1 : 2
4. A 3-blade fan and a 4-blade fan of the same length make 120 revolutions in a minute. The distance covered by the end of a 4-blade fan is \_\_\_\_\_ times that of a 3-blade fan.  
 (A)  $\frac{16}{9}$     (B)  $\frac{4}{3}$     (C) 1    (D)  $\frac{3}{4}$     (E)  $\frac{9}{16}$



5. Radius  $OA$  of a circle is perpendicular to the tangent  $CAB$ . If the length of  $OA$  is 2, then what is the ratio of  $OC$  to  $OB$ ?



- (A)  $\sqrt{2} : 4$  (C)  $1 : 2$  (E)  $1 : \sqrt{3}$   
 (B)  $1 : 3$  (D)  $1 : \sqrt{2}$
6. The diagonal of the square in the figure is  $7\sqrt{2}$  ft. If the painting costs \$10 per sq. ft, how much will it approximately cost to paint the entire design? ( $\triangle ABF$ ,  $\triangle DCE$  are equilateral triangles. The curves containing  $AD$  and  $BC$  are semi-circles) Indicate all possible answers.



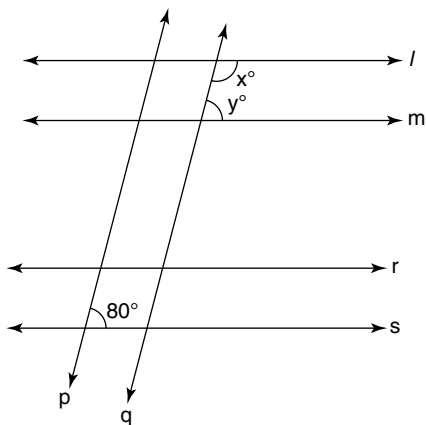
- (A) 690 (C) 1090 (E) 1690  
 (B) 890 (D) 1290

7. A metallic cylinder of diameter 14 units and height 98 units is cast into hemispherical bowls with outer radius 14 units and thickness 7 units. How many bowls can be drawn from the cylinder?  
 (A) 2 (B) 3 (C) 5 (D) 7 (E) 14
8. Which of the quadrilateral(s) has/have diagonals perpendicular to each other? (Indicate all possible answers).  
 (A) Parallelogram (D) Trapezoid  
 (B) Rectangle (E) Rhombus  
 (C) Square
9.  $ABC$  and  $ACD$  are two right-isosceles triangles with a common side  $AC$ . If  $BC = 4\sqrt{2}$  and points  $B, C, D$  lie on a line, then what is the length of  $BD$ ? (Indicate all such answers).  
 (A)  $4\sqrt{3}$  (C) 8 (E)  $12\sqrt{2}$   
 (B)  $4 + 4\sqrt{3}$  (D)  $8\sqrt{2}$
10. Two wheels  $A$  and  $B$  have diameters in the ratio  $1 : 2$ . What is the ratio of the distance traveled by 100 revolutions of wheel  $A$  to the distance traveled by 200 revolutions of wheel  $B$ ? (Indicate all such answers).  
 (A)  $1 : 8$  (B)  $1 : 4$  (C)  $1 : 2$  (D)  $2 : 1$  (E)  $4 : 1$

**Exercise No. 2**

**Directions:** Select the correct option from the choices that follow.

1.



Lines  $l, m, r$  and  $s$  are parallel to each other. Transversals  $p$  and  $q$  are parallel to each other. What is the value of  $x$ ?

- (A)  $80^\circ$  (B)  $90^\circ$  (C)  $100^\circ$  (D)  $110^\circ$  (E)  $120^\circ$

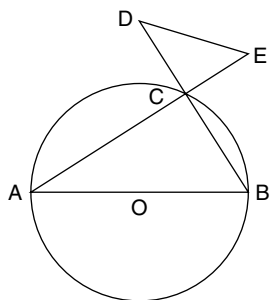
2. The ratio of the volume of a cone to the volume of a cylinder of the same height is 1 : 3. If the diameter of cone is 6 cm, what is the radius (in cm) of the cylinder?

- (A) 2 (B) 3 (C) 6 (D) 9 (E) 18

3. The area of a sector is 180 sq. units. If the diameter is 36 units, what is the length of the arc?

- (A) 10 (B) 12 (C) 15 (D) 20 (E) 40

4.



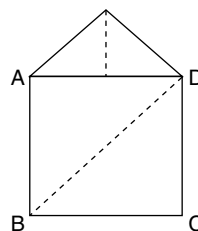
Triangle  $ABC$  is inscribed in a circle with diameter  $AB$ . What is the sum of  $\angle D$  and  $\angle E$ ?

- (A) 60 (B) 75 (C) 80 (D) 90 (E) 120

5. A rhombus with an interior angle of  $60^\circ$  has a perimeter equal to that of a square. The area of the rhombus is how many times the area of the square?

- (A)  $\frac{1}{\sqrt{3}}$  (B)  $\frac{2}{\sqrt{3}}$  (C)  $\frac{\sqrt{3}}{2}$  (D)  $\sqrt{3}$  (E)  $\frac{8}{\sqrt{3}}$

6. An equilateral triangle  $AED$  and square  $ABCD$  share a common side  $AD$ . If the height of the equilateral triangle is  $5\sqrt{3}$ , then the diagonal of the square is \_\_\_\_\_.

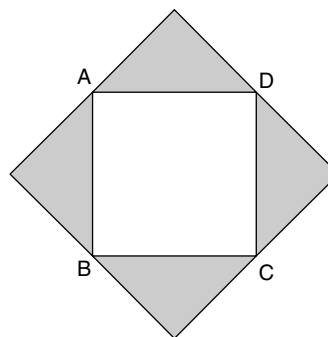


- (A)  $5\sqrt{2}$  (C) 10 (E)  $10\sqrt{3}$   
 (B)  $5\sqrt{3}$  (D)  $10\sqrt{2}$

7. What is the possible ratio of the total number of diagonals in a pentagon to the number of diagonals in an octagon?

- (A)  $\frac{1}{4}$  (B)  $\frac{2}{7}$  (C)  $\frac{5}{7}$  (D)  $\frac{4}{5}$  (E) 1

8. A painter paints the four equilaterally triangular regions adjoining the sides of a square  $ABCD$  of diagonal  $10\sqrt{2}$ . What is the ratio of the shaded region to the unshaded region?



- (A)  $\sqrt{3} : 2$  (C) 2 : 1 (E)  $\sqrt{5} : 2$   
 (B)  $\sqrt{3} : 1$  (D)  $\sqrt{5} : 1$

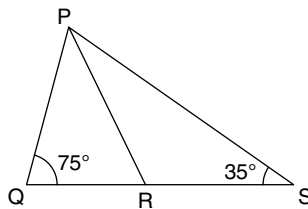
9. What is the volume of a cuboid formed by joining two cubes with a diagonal of  $10\sqrt{3}$  each?  
 (A) 500            (C) 2000            (E) 4000  
 (B) 1000          (D) 3000
10. Circumference of the circular base of a conical tent is  $10\sqrt{2}$  and the slant height is  $5\sqrt{2}$ . Find the curved surface area of the conical tent.  
 (A) 25            (C) 50            (E) 100  
 (B)  $25\sqrt{2}$       (D)  $50\sqrt{2}$

### Exercise No. 3

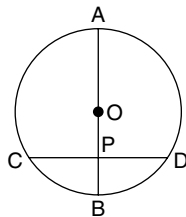
**Directions:** Write your answer to the given questions in the box(es) provided. Questions that have a correct answer in the integer or decimal form are provided with one box. Questions that have a correct answer in the form of fractions have two boxes, one for the numerator and the other for the denominator.

1. If the ratio of the interior angle to the exterior angle of a regular polygon is 4 : 1, then the number of sides of the polygon is

2. In the figure,  $PQ = PR$ ,  $\angle Q = 75^\circ$ ,  $\angle S = 35^\circ$  then,  $\angle SPR$  is \_\_\_\_\_.




3. Chord  $CD$  of length 8 units is perpendicular to diameter  $AB$  of length 10 units. What is the perpendicular distance from  $O$  to  $CD$ ?




4. An equilateral triangle of side 26 inches is formed by joining the mid-points of a triangle  $ABC$ . What is the perimeter of the triangle  $ABC$ ?

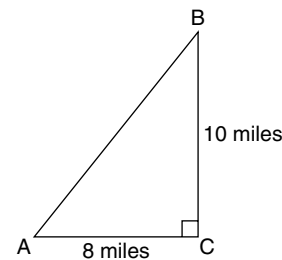
 inches

5. The area of the four walls of a room with length 10 inches, width 8 inches, and height 6 inches is

 inches

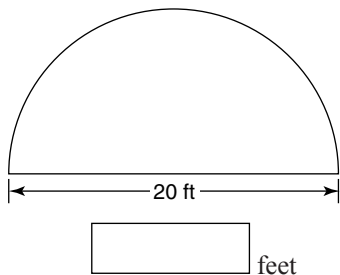
6. The exterior angle of a regular decagon is what fraction of the interior angle of a regular hexagon?


7. How many miles would be saved by traveling from  $A$  to  $B$  (Refer to the fig.) when compared to traveling from  $A$  to  $B$  through  $C$  (rounded to nearest integer)?




8. What is the area of the largest square that can be inscribed in a circle of radius 10?

9. The figure shows the dimensions of a semi-circular cross section of a one-way tunnel. A single traffic lane is 12 feet wide, and is equidistant from the sides of the tunnel. If vehicles must clear the top of the tunnel by at least  $\frac{1}{2}$  foot, when they are inside the traffic lane, what should be the limit on the height of the vehicles that are allowed to use the tunnel?



10. If the radius of a cylinder is reduced by 50% and the height is increased by 100%, then what is the percent change in its volume?

### Exercise No. 4

**Directions:** Compare Column A with Column B, using additional information, if given and select from one of the following four answer choices.

- A. Column A is greater.
- B. Column B is greater.
- C. The two columns are equal.
- D. The relationship cannot be determined from the information given.

1. A cube has a side of 8 units and a cuboid has dimensions  $4 \times 8 \times 16$  units.

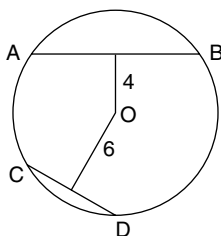
**Column A**

The volume of the cuboid.

**Column B**

The volume of the cube.

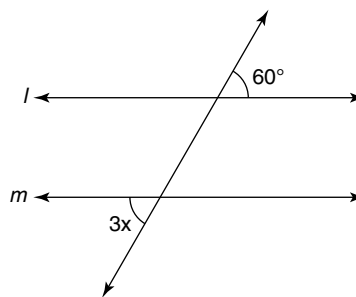
2.  $AB$  and  $CD$  are two chords, that are 4 units, and 6 units respectively from the center.



**Column A**  
 $CD$

**Column B**  
 $AB$

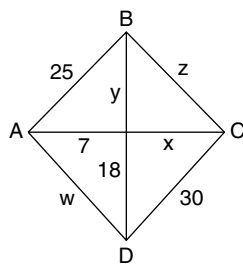
3. Transversal  $t$  intersects two parallel lines  $l$  and  $m$ .



**Column A**  
 $x$

**Column B**  
 $60^\circ$

4.  $AC$  &  $BD$  are perpendicular to each other.



**Column A**

$w$

**Column B**

$z$

5. The diameter of a cone is three times the diameter of a cylinder of the same height.

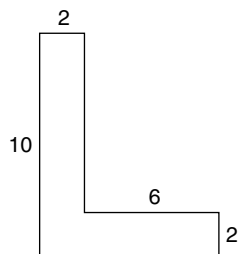
**Column A**

Volume of the cone

**Column B**

Volume of the cylinder

6. The width of an  $L$ -shaped figure is 2 units



**Column A**

Area of the figure

**Column B**

34 sq. units

7. A hollow cylinder 7 units high has an external diameter of 8 units and an internal diameter of 4 units.

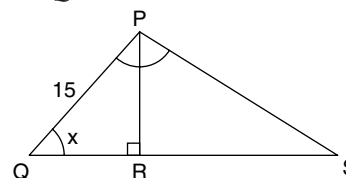
**Column A**

Three times the volume of the hollow cylinder

**Column B**

264

8.  $\angle QPS = \angle QSP = 50^\circ$



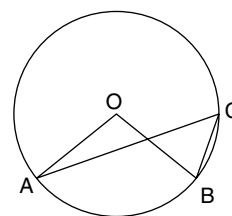
**Column A**

$PS$

**Column B**

15

9.  $A$ ,  $B$ , and  $C$  are three points that lie on a circle.  $O$  is the centre of the circle.



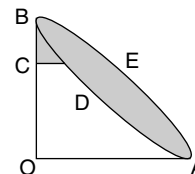
**Column A**

$\angle O$

**Column B**

$\angle C$

10. The area of the sector  $OAB$  is one quarter of a circle of diameter 14. The length of  $OC$  is 3. The arcs  $ADB$  and  $AEB$  are of the same length.



**Column A**

30

**Column B**

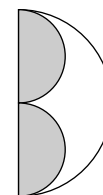
Area of the shaded region

### Exercise No. 5

**Directions for Questions 1–5:** Select the correct option from the choices that follow the question.

1. At 1 pm, a tower 24 units high had a shadow 7 units long measured from the foot of the tower. At 5 pm, the distance between the top of the tower and the top of the shadow was 30 units. How far did the shadow of the tower move between 1 pm and 5 pm (in units)?  
 (A) 7 (B) 11 (C) 18 (D) 24 (E) 28

2. The diameter of each of the two shaded semi-circular regions is 14 units. The area of the shaded region is what percent of the area of the larger semi-circle?  
 (A) 10 (C) 25 (E) 60  
 (B) 20 (D) 50



3. A spherical ball of maximum size is fit into a cylindrical vessel of radius 5 units and height 5 units. The ratio of the volume of the sphere to that of the cylinder is

- (A) 1 : 6      (C) 3 : 4      (E) 4 : 8  
 (B) 4 : 4      (D) 4 : 3

4. Triangle  $ABC$  is a right isosceles triangle, where  $AB = BC$ . A circle is drawn with  $B$  as the center passing through  $A$  and  $C$ . What is the area of the sector  $ABC$ , if the length of the line segment  $AC$  is  $7\sqrt{2}$ ?

- (A)  $\frac{294\pi}{4}$       (C)  $\frac{49\pi}{4}$       (E)  $\frac{49}{4}$   
 (B)  $\frac{147\pi}{4}$       (D) 44

5. A hemispherical bowl of diameter 6 units is filled with a liquid. How many cylindrical containers of diameter 2 units and height 1 unit can be filled with the same liquid?

- (A) 180    (B) 90    (C) 45    (D) 30    (E) 18

**Directions for Questions 6–10: Compare Column A with Column B, using the additional information if given. Select one of the following four answer choices.**

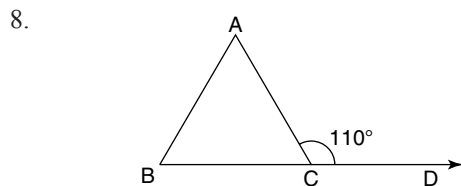
- A. Column A is greater.  
 B. Column B is greater.  
 C. The two columns are equal.  
 D. The relationship cannot be determined from the information given.

6. The surface area of a sphere divided by its volume is 4.

- |                 |                          |
|-----------------|--------------------------|
| <b>Column A</b> | <b>Column B</b>          |
| $\frac{4}{3}$   | The radius of the sphere |

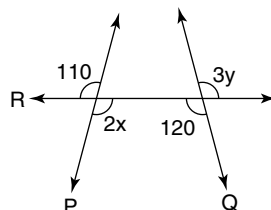
7. The area of a regular hexagon is  $6\sqrt{3}$

<b>Column A</b>	<b>Column B</b>
The side of the hexagon	2

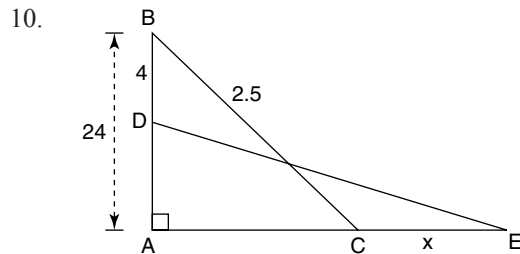


- |                 |                 |
|-----------------|-----------------|
| <b>Column A</b> | <b>Column B</b> |
| $\angle A$      | 50              |

9. Lines  $P$  and  $Q$  intersect line  $R$ .



- |                 |                 |
|-----------------|-----------------|
| <b>Column A</b> | <b>Column B</b> |
| $x + y$         | 105             |



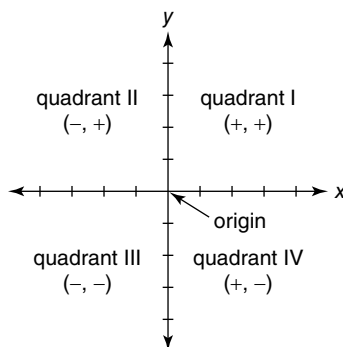
- $AB = 24, DB = 4, BC = 25, CE = x$
- |                 |                 |
|-----------------|-----------------|
| <b>Column A</b> | <b>Column B</b> |
| $x$             | 8               |

# CHAPTER 21

## Coordinate Geometry

### Coordinate Geometry

A coordinate plane is formed by the intersection of a horizontal number line called  $X$ -axis, and a vertical number line called  $Y$ -axis. The lines intersect at a point called the origin  $(0, 0)$ . This representation is called the rectangular coordinate system. The axes divide the plane into four quadrants as shown.



#### Tips

The line equation of  $x$ -axis is  $y = 0$ .

The line equation of  $y$ -axis is  $x = 0$ .

### Properties of $X$ -axis and $Y$ -axis

One way to specify the exact position of a point on the **two-dimensional number plane** is to use an **ordered pair** of numbers in the form  $(x, y)$ .

The  $X$ -axis is an ordinary number line with positive numbers to the right of the origin ' $O$ ' and negative numbers to the left of ' $O$ '. Similarly, the  $Y$ -axis is a vertical number line with positive numbers above ' $O$ ' and negative numbers below ' $O$ '.

- Each point ' $P$ ' in the coordinate plane has two coordinates:  $x$ -coordinate ' $x$ ' and  $y$ -coordinate ' $y$ ', represented as  $P(x, y)$ .
- Points on  $X$ -axis have positive values to the right of ' $O$ ' and negative values to the left of ' $O$ '. They are represented as  $P(x, 0)$  or  $P(-x, 0)$ .

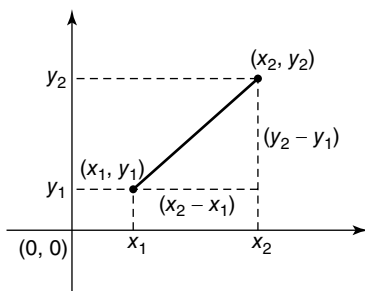
- Points on  $Y$ -axis have positive values above 'O' and negative values below 'O'. They are represented as  $P(0, y)$  or  $P(0, -y)$ .
- For any point on the coordinate plane, the distance from the  $x$ -axis is  $|y|$  and the distance from the  $y$ -axis is  $|x|$ .
- All points on a line parallel to the  $y$ -axis have the same  $x$ -coordinates.
- All points on a line parallel to the  $x$ -axis have the same  $y$ -coordinates.

Slope Type	Orientation	Quadrant
Positive	/	I – III
Negative	\	II – IV
Zero	Horizontal	Parallel to $x$ -axis
Undefined	Vertical	Parallel to $y$ -axis

- If a line passes from the first quadrant to the third quadrant, then the slope is positive.
- If a line passes from the second quadrant to the fourth quadrant, then the slope is negative.

Problems on coordinate geometry that appear on the  $GRE^{\text{®}}$  mostly require finding the distance between points, and the relationship between the equation of a line and its graphical representation.

To find the distance between two points, use the Pythagorean Theorem.



The distance between the two points  $(x_1, y_1)$  and  $(x_2, y_2) = \sqrt{(y_2 - y_1)^2 + (x_2 - x_1)^2}$ .

**Mid Point:** The mid point of the line joining  $(x_1, y_1)$  and  $(x_2, y_2)$  is given by  $\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$ .

**Equation of a Line:** To find the equation of a line 'l', we need at least two points on the rectangular coordinate system. If  $P(x_1, y_1)$  and  $Q(x_2, y_2)$  are two points, then the equation of the line is given by,

$$(y - y_1) = m(x - x_1)$$

where  $m = \frac{y_2 - y_1}{x_2 - x_1}$  is the slope of the line passing through the points  $P(x_1, y_1)$ ,  $Q(x_2, y_2)$ .

**Coefficient form:**

$$ax + by + c = 0$$

$\downarrow$                        $\downarrow$                        $\downarrow$   
 $x$  - coefficient     $y$  - coefficient    constant

$$\text{Slope 'm'} = \frac{-a}{b}$$



**Tips**

The equation of the line parallel to  $x$ -axis is  $y = b$ .

The equation of the line parallel to  $y$ -axis is  $x = a$ . ( $a$  and  $b$  are constants).



**Tips**

Intercept is the length from the origin to the point of intersection on the axis.



**Intercept form:**  $\frac{x}{a} + \frac{y}{b} = 1$ .

'b': Y intercept, the point at which a line crosses the y axis.

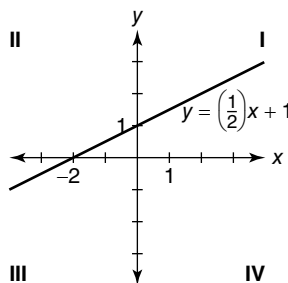
'a': X intercept, the point at which a line crosses the x axis.

$$\text{Slope 'm'} = \frac{-b}{a}$$

**Slope form:**  $y = mx + b$ , where  $m$  is the slope.

(i) y-intercept =  $b$             (ii) x-intercept (a) =  $-b/m$

For example, the equation of a line, with x-intercept:  $-2$  and y-intercept:  $1$ , is as shown on the rectangular coordinate system.



**Tips**

In the line equation  $ax + by + c = 0$ , if  $c = 0$ , it represents the line passing through the origin.

*Example:* Find the slope and y-intercept of the line  $2x + 3y = 5$ .

*Solution:* Given the line  $2x + 3y = 5$ .

$$y = \frac{-2}{3}x + \frac{5}{3}$$

The slope of the line is  $\frac{-2}{3}$  and its y-intercept is  $\frac{5}{3}$ .

*Example:* Find the slope and the equation of the line in the form of  $ax + by + c = 0$ , passing through the points  $(2, 3)$  and  $(-2, 5)$ .

*Solution:* The equation of the line is given by

$$(y - y_1) = m(x - x_1)$$

where

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

Hence,

$$\text{slope } m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{5 - 3}{-2 - 2} = \frac{2}{-4} = -\frac{1}{2}$$

The line equation is

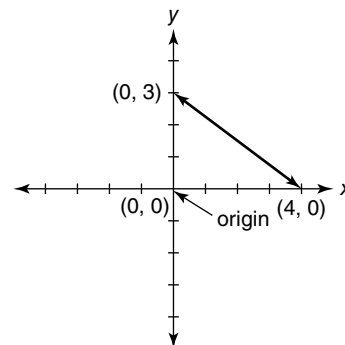
$$(y - 3) = \left(-\frac{1}{2}\right)(x - 2)$$

Hence, the coefficient form of line equation is  $x + 2y - 8 = 0$ .

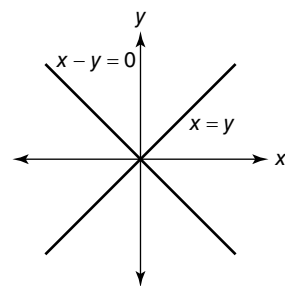
*Example:* Find the area of the triangle formed by joining the points  $(0, 0)$ ,  $(0, 3)$  and  $(4, 0)$ .

*Solution:* The lines that join the points  $(0, 0)$ ,  $(0, 3)$  and  $(4, 0)$  form a right-angled triangle.

$$\text{Area of the triangle} = \frac{1}{2} \times 3 \times 4 = 6 \text{ units.}$$

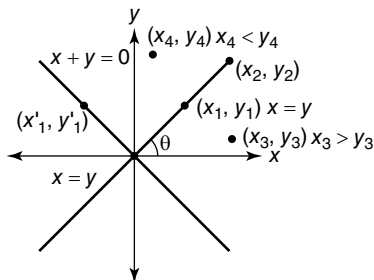


**Note 1:** The lines  $x + y = 0$  and  $x = y$  are represented in the  $xy$  coordinate plane as shown in the figure. These lines pass through the origin and they are perpendicular to each other.



**Note 2:** The slope depends on the angle of inclination of the line with respect to  $x$ -axis in the figure.

- If  $\theta = 45^\circ$ ,  $x = y$  and  $m = 1$ .
- If  $\theta > 45^\circ$ ,  $x < y$  and  $m > 1$ .
- If  $\theta < 45^\circ$ ,  $x > y$  and  $m < 1$ .



**Tips**  
Slope of the line  $x = y$  is 1, and slope of the line  $x + y = 0$  is  $-1$ .

**Parallel lines/perpendicular lines:**

- If ' $l_1$ ' and ' $l_2$ ' are two lines and  $m_1$  and  $m_2$  are the respective slopes, then ' $l_1$ ' is parallel to ' $l_2$ ' if  $m_1 = m_2$  and  $l_1$  is perpendicular to ' $l_2$ ' if  $m_1 \times m_2 = -1$ .
- If the equation of a line ' $l_1$ ' is  $a_1x + b_1y + c_1 = 0$  then, the equation of the line parallel to ' $l_1$ ' is  $a_1x + b_1y + c_2 = 0$  and the equation of the line perpendicular to ' $l_1$ ' is  $b_1x - a_1y + c_3 = 0$ .
- Two lines  $a_1x + b_1y + c_1 = 0$  -----  $l_1$   
 $a_2x + b_2y + c_2 = 0$  -----  $l_2$ .

Let the slope of line  $l_1$  is  $m_1 = -\frac{a_1}{b_1}$  and the slope of line  $l_2$  is  $m_2 = -\frac{a_2}{b_2}$ .

I. If  $l_1$  is parallel to  $l_2$  then  $m_1 = m_2$

$$\Rightarrow \frac{a_1}{b_1} = \frac{a_2}{b_2}, \text{ [The two lines differ by their constant values].}$$

II. If  $l_1$  and  $l_2$  are intersect then  $m_1 \neq m_2$

$$\Rightarrow \frac{a_1}{b_1} \neq \frac{a_2}{b_2}$$

III. If  $l_1$  is perpendicular to  $l_2$  then  $m_1 \times m_2 = -1$

$$\Rightarrow \left(-\frac{a_1}{b_1}\right)\left(-\frac{a_2}{b_2}\right) = -1$$

$$\Rightarrow a_1a_2 + b_1b_2 = 0$$

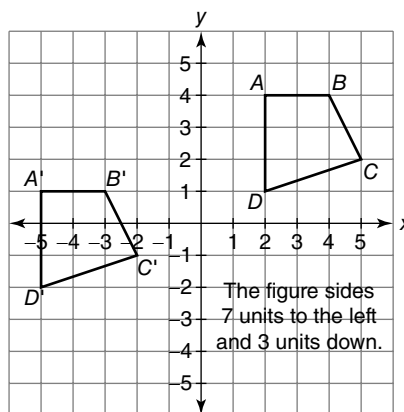


1. If  $l_1 // l_2$  and  $l_2 // l_3$ , then  $l_1 // l_3$ .
2. If  $l_1 \perp l_2$  and  $l_2 \perp l_3$ , then  $l_1 // l_3$ .

**Transformation:** Transformations deal with translations, rotations and reflections. The questions on the GRE® mostly deal with reflections of a line.

**Translation:** A translation moves a slope without any rotation or reflection.

*Example:* In the graph given, the figure has been translated by 3 units down and by 7 units to the left.



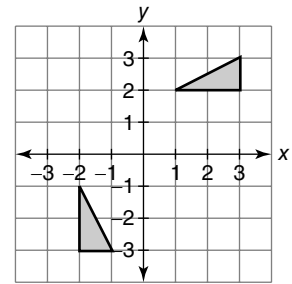
The figure sides 7 units to the left and 3 units down.



**Tips**  
Reflection about a line is same as symmetry about the line.

**Rotation:** Rotation of a figure is turning a figure about a given point. The fixed point around which a figure is rotated is called the centre of rotation. The amount of rotation is called the angle of rotation and is measured in degrees.

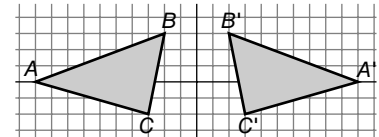
*Example:* In the graph, the triangle is rotated by  $270^\circ$  anti-clockwise or  $90^\circ$  clockwise.



**Reflection:** Reflection is a transformation in which the figure is the mirror image of the other. To reflect an object means to produce its mirror image with respect to a line, called the line of reflection. The mirror image is produced on the other side of the line.

*Example:* In the figure, the triangle  $ABC$  is reflected over the  $y$ -axis.

**Reflection:** A reflection is a map that transforms an object into its mirror image with respect to a 'mirror', which is a hyper plane of fixed points in geometry.



(or)

A reflection over a line is a transformation in which each point of the original figure has an image that is at the same distance from the line of reflection as the original point is but is on the opposite side of the line.

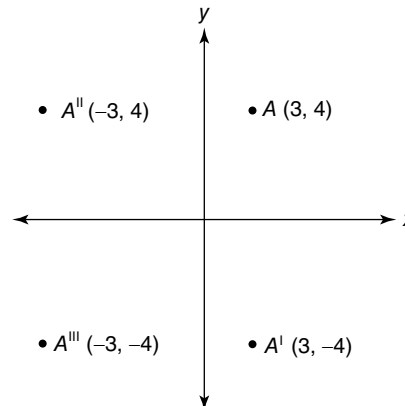
A line reflection creates a figure that is congruent to the original figure.

### Reflection of Point



#### Tips

If the slope of a line is positive, then the reflection of the line about the  $x$ -axis and  $y$ -axis is negative.



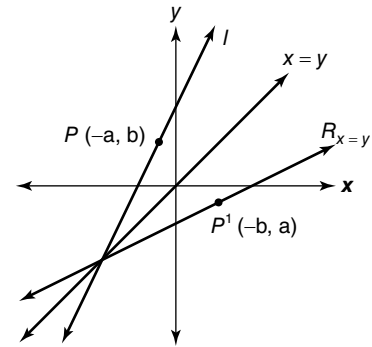
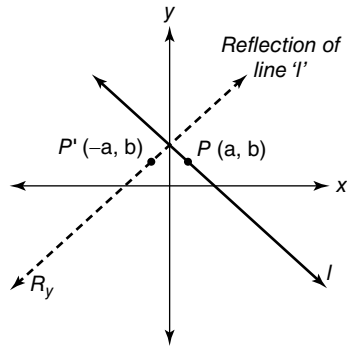
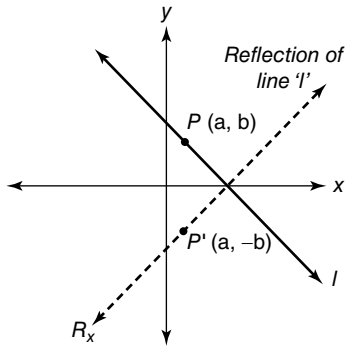
In the above coordinate system, the points  $A^I$ ,  $A^{II}$  and  $A^{III}$  have the same coordinates as  $A$  has, except for the sign. These points are geometrically related to  $A$  as follows:

$A^I$  and  $A^{II}$  are the reflections of  $A$  about  $X$ -axis and  $Y$ -axis respectively.

$A^{III}$  is the reflection of  $A$  about the origin.

$A^I$  and  $A$ ,  $A^{II}$  and  $A$ ,  $A^{III}$  and  $A$  are symmetric about  $X$ -axis,  $Y$ -axis, and the origin respectively.

Reflection of a line with respect  $x$ -axis,  $y$ -axis and the line  $x = y$



where  $R_x \rightarrow$  Reflection of line ' $l$ ' on  $x$ -axis,  
 $R_y \rightarrow$  Reflection of line ' $l$ ' on  $y$ -axis, and  
 $R_{x=y} \rightarrow$  Reflection of line ' $l$ ' on the line  $x = y$  passing through the origin.

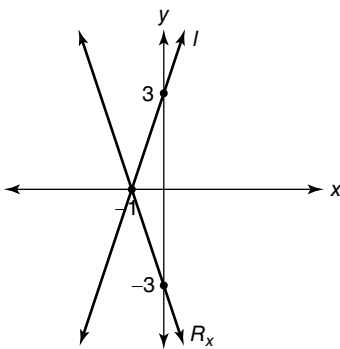
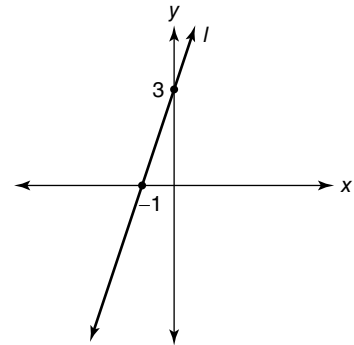
- (I)  $R_x \parallel R_y$                       (II)  $R_x \perp R_{x=y}$                       (III)  $R_y \perp R_{x=y}$

*Example:* Find the reflections of the line  $3x - y + 3 = 0$  about  $x$ -axis,  $y$ -axis and the line  $x = y$ .

The given line equation ( $l$ ) is  $3x - y + 3 = 0$

$$\Rightarrow a = 3, b = -1, c = 3$$

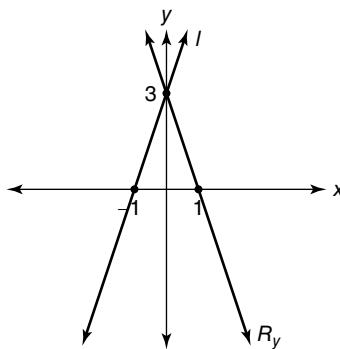
$$\Rightarrow \frac{x}{-1} + \frac{y}{3} = 1 \Rightarrow l$$



$$\frac{x}{-1} + \frac{y}{-3} = 1 \Rightarrow R_x$$

$$\Rightarrow 3x + y + 3 = 0$$

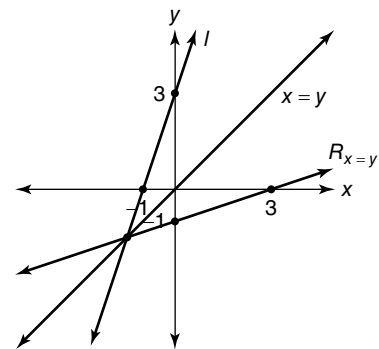
$$\Rightarrow a = 3, b = 1, c = 3$$



$$\frac{x}{1} + \frac{y}{3} = 1 \Rightarrow R_y$$

$$\Rightarrow -3x - y + 3 = 0$$

$$\Rightarrow a = -3, b = -1, c = 3$$



$$\frac{x}{3} + \frac{y}{-1} = 1 \Rightarrow R_{x=y}$$

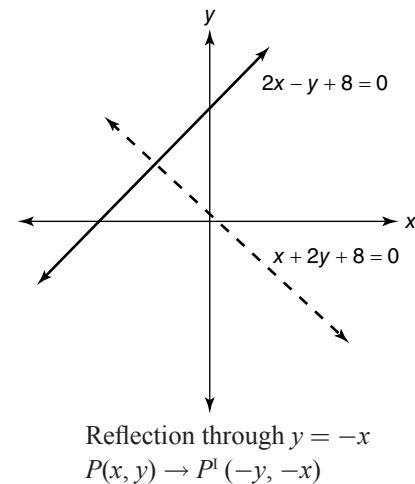
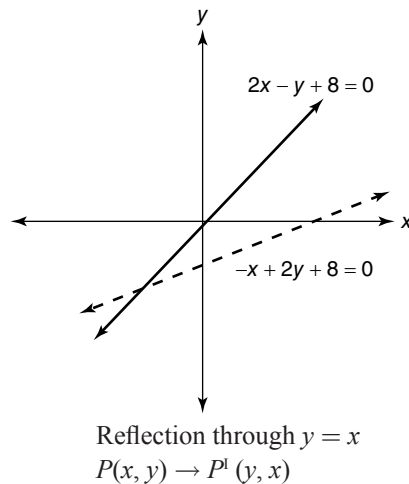
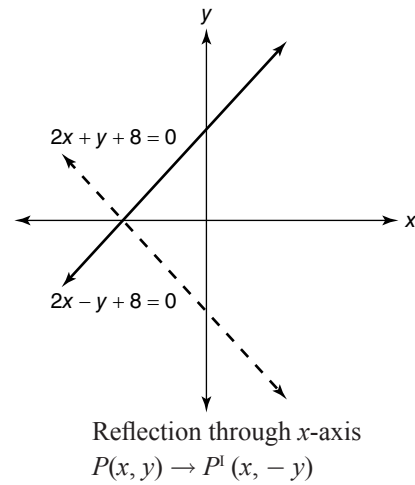
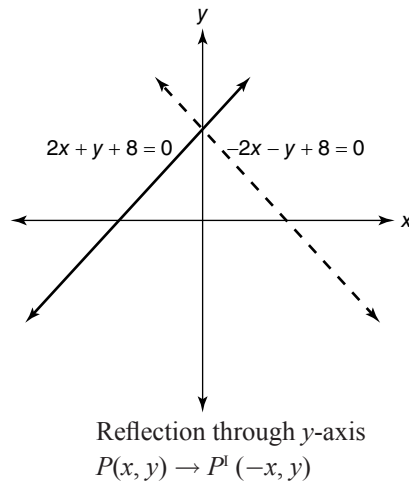
$$\Rightarrow -x + 3y + 3 = 0$$

$$\Rightarrow a = -1, b = 3, c = 3$$

Comparing among the coefficients of the line  $l$ ,  $R_x$ ,  $R_y$ , and  $R_{x=y}$

	<b>x-coefficient</b>	<b>y-coefficient</b>	<b>Constant</b>
$l$	$a$	$b$	$c$
$R_x$	$a$	$-b$	$c$
$R_y$	$-a$	$b$	$c$
$R_{x=y}$	$b$	$a$	$c$

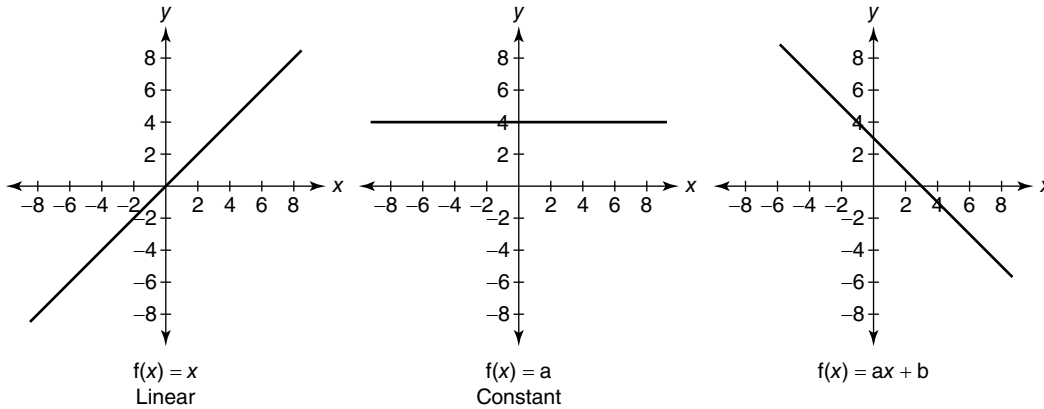
Examples:



### Graphs of Functions

The rectangular coordinate system is used to draw graphs of the functions. The graph of a function on the  $xy$  plane is the path connecting all the ordered pair points  $(x, y)$ , where  $x$  represents each input value and  $y = f(x)$  represents the corresponding output value. In other words, the input is represented on  $x$ -axis and the output is represented on  $y$ -axis.

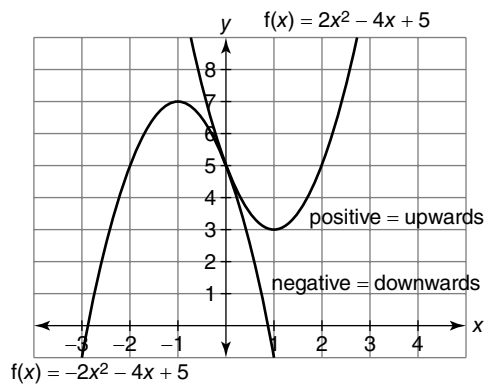
#### The graphs of a few elementary functions with linear equations.



The graph of quadratic equation in the form of  $f(x) = y = ax^2 + bx + c$  where  $a$ ,  $b$ , and  $c$  are constants and  $a \neq 0$ , is a parabola and  $f(x, y) = (x - a)^2 + (y - b)^2 = r^2$  is an equation of a circle with center  $(a, b)$  and radius ' $r$ '. The  $x$ -intercept of a parabola is the solution of the equation  $ax^2 + bx + c = 0$ .

If  $a$  is positive, the parabola opens upwards and if  $a$  is negative, the parabola opens downwards.

Example:

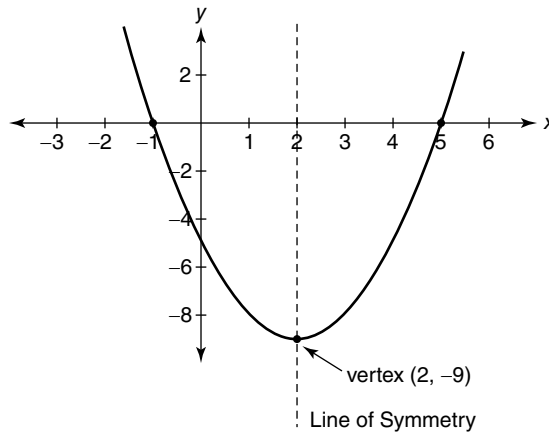


#### Tips

In the graphs of a function, for every output value, there exists at least one input value.

If the output value corresponds to more than one input value, the graph can be a curve.

*Example:* Find the equation of the graph shown below.



*Solution:* The point  $(2, -9)$  is the vertex of the parabola. The graph indicates that the  $x$ -intercepts of the parabola are  $-1$  and  $5$ . These  $x$  intercepts are the solutions of the quadratic equation of the parabola.

Hence, the equation of the curve is

$$(x + 1)(x - 5) = 0 \Rightarrow x^2 - 4x - 5 = 0$$

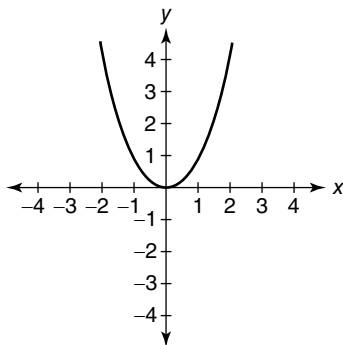
$\therefore$  The equation of the parabola is  $y = x^2 - 4x - 5$ , the point  $(2, -9)$  indicates for  $x = 2, y = -9$  in the above parabola.



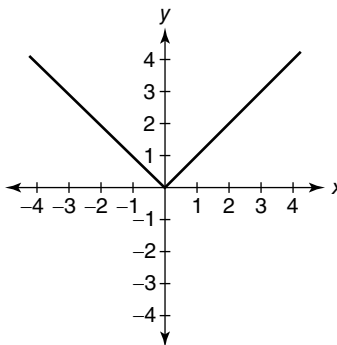
**Tips**

The equation of a parabola about  $x$ -axis is given by  $x = ay^2 + by + c$ .

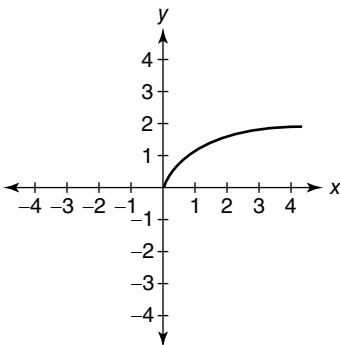
**The graphs of a few elementary functions with non-linear equations.**



$f(x) = x^2$   
Quadratic



$f(x) = |x|$   
Absolute Value



$f(x) = \sqrt{x}$   
Square root

## PRACTICE EXERCISE

## Exercise No. 1

**Directions:** Select all the options that are correct as per the information given. Remember that one or more options may be correct.

- In the  $xy$  - plane, the equation of the line  $k$  is  $2x + 3y = 7$ . If  $l$  is the reflection of the line  $k$  across  $y$ -axis, what is the equation of line  $l$ ?
 

(A)  $2x + 3y + 7 = 0$       (D)  $3y + 2x = 7$   
 (B)  $2x - 3y = 7$       (E)  $3y - 2x + 7 = 0$   
 (C)  $3y - 2x = 7$       (F)  $y = 2x + 7$
- Which of the following equations have an undefined slope?
 

(A)  $x = -4$       (C)  $x = y$       (E)  $y = 12$   
 (B)  $y = 7$       (D)  $x = -7$       (F)  $x = -11$
- Which of the following is the slope of the line perpendicular to the line  $3y + 2x = 6$ ?
 

(A)  $2/3$       (C)  $6/4$       (E)  $3/2$   
 (B)  $\frac{1}{\left(\frac{2}{3}\right)}$       (D)  $-3/2$       (F)  $-2/3$
- What is the equation of the line that passes through points  $(-1, -2)$  and  $(-2, -1)$ ?
 

(A)  $x + y + 1 = 0$       (D)  $x - y - 3 = 0$   
 (B)  $x - y - 1 = 0$       (E)  $x + y - 1 = 0$   
 (C)  $x + y + 3 = 0$
- Which of the following has a slope 0?
 

(A)  $y = -6$       (C)  $y = -1$       (E)  $x = 6$   
 (B)  $y = -4$       (D)  $x = 5$
- What could be the value of ' $k$ ' if the line  $2x + 3y = 13$  is parallel to  $4x + 6y + k = 0$ ?
 

(A)  $-13$       (B)  $-12$       (C)  $11$       (D)  $13$       (E)  $17$
- Which of the following statements is/are correct regarding the midpoint of a line segment?
 

(A)  $X$  is the midpoint of  $\overline{MN}$ . If the coordinates of  $M$  are  $(-2, 3)$  and coordinates of  $X$  are  $(1, 0)$ , then the coordinates of  $N$  are  $(4, 3)$ .  
 (B)  $X$  is the midpoint of  $\overline{MN}$ . If the coordinates of  $M$  are  $(-2, 3)$  and coordinates of  $X$  are  $(1, 0)$ , then the coordinates of  $N$  are  $(4, -3)$ .  
 (C) The coordinates of the midpoint of a line segment with end points  $(x_1, x_2)$  and  $(y_1, y_2)$  are  $[(x_1 + x_2)/2, (y_1 + y_2)/2]$ .  
 (D) The coordinates of the midpoint of a line segment with end points  $(x_1, x_2)$  and  $(y_1, y_2)$  are  $[(x_1 + x_2)/3, (y_1 + y_2)/3]$ .  
 (E) The coordinates of the midpoint of a line segment with end points  $(3, 4)$  and  $(-1, 2)$  are  $(1, 3)$ .
- Which of the following line(s) pass(es) through the points  $(-2, -1)$  and  $(3, 2)$ ?
 

(A)  $5x + 3y - 1 = 0$       (D)  $\frac{y}{5} + \frac{x}{3} = 1$   
 (B)  $5y - 3x - 1 = 0$       (E)  $\frac{y}{5} - \frac{x}{3} = 1$   
 (C)  $y = \frac{3}{5}x + 1$
- Which of the following line(s) do(es) not pass through the points  $(1, 2)$  and  $(-1, -2)$ ?
 

(A)  $\frac{4y - 8x}{11} = 0$       (D)  $y = 2x - 4$   
 (B)  $y - 3x + 4 = 0$       (E)  $\frac{x}{2} - \frac{y}{4} = 1$   
 (C)  $2x + y + 4 = 0$
- Find the coordinates of the point, which lies on the line segment joining the points  $(4, 3)$ ,  $(6, 9)$ .
 

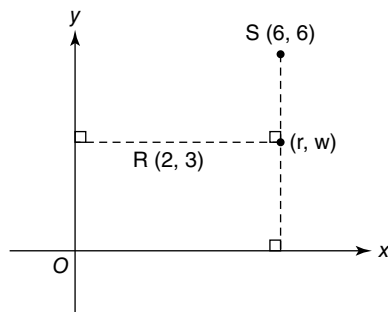
(A)  $(0, -9)$       (C)  $(9, 0)$       (E)  $(1, 9)$   
 (B)  $(0, 9)$       (D)  $(-9, 0)$



### Exercise No. 2

**Directions:** Select the correct option from the choices that follow.

- If the midpoint of  $(a, b)$  and  $(-2, 4)$  is  $(4, -4)$ , then the sum of  $a$  and  $b$  is  
(A) 4 (B) 2 (C) 0 (D)  $-2$  (E)  $-4$
- The vertices of a quadrilateral are  $A(1,0)$ ,  $B(1, 6)$ ,  $C(9, 6)$  and  $D(9, 0)$ . Then the sum of its diagonals is  
(A) 20 (B) 18 (C) 16 (D) 14 (E) 10
- The shortest distance from point  $(2, -2)$  to the line  $4x + 3y = 0$  is  
(A)  $\frac{-2}{5}$  (B)  $\frac{1}{5}$  (C)  $\frac{2}{5}$  (D)  $\frac{3}{5}$  (E) 1
- $3x + 4y + c_1 = 0$  and  $3x + 4y + c_2 = 0$  are two parallel lines. If  $|c_1 - c_2| = 5$ , then what is the shortest distance between the two parallel lines?  
(A)  $-1$  (B) 0 (C) 1 (D) 2 (E) 5
- If  $A$ ,  $B$ , and  $C$  are three collinear points, then the area of the figure formed by the straight lines joining the points  $A$ ,  $B$  and  $C$  is  
(A) 0 (B) 1 (C) 2 (D) 4 (E) 6
- If the distance between two points  $A(2,4)$  and  $B(a, b)$  is 4, then the coordinates of  $B$  can be  
(A)  $(1, 0)$  (C)  $(4, 0)$  (E)  $(4, 4)$   
(B)  $(2, 0)$  (D)  $(4, 2)$
- What is the area of a quadrilateral with coordinates  $(2, 0)$ ,  $(2, 6)$ ,  $(4, 6)$  and  $(4, 0)$ ?  
(A) 4 (B) 8 (C) 10 (D) 12 (E) 16
- The midpoint of two points  $(-4, 2)$  and  $(8, b)$  is  $(a, 4)$ . The product of  $a$  and  $b$  is:  
(A) 6 (B) 8 (C) 12 (D) 16 (E) 20
- The line  $4x + y - 4 = 0$  divides the line segment joining the points  $(1, 1)$  and  $(-2, 10)$  in the ratio of  
(A) 1 : 2 (B) 1 : 3 (C) 1 : 4 (D) 1 : 6 (E) 1 : 8
- What are the coordinates of  $(r, w)$ ?



- (A)  $(3, 6)$  (C)  $(6, 3)$  (E)  $(0, 6)$   
(B)  $(6, 6)$  (D)  $(6, 0)$

### Exercise No. 3

**Directions:** Write your answer to the given questions in the boxes provided. Questions that have the correct answer in the form of integer or decimal are provided with one box. Questions that have the correct answer in the form of fractions have two boxes, one for the numerator and the other for the denominator.

- Sum of the  $x$  and the  $y$  intercepts of the line  $3x + 4y = 12$  is
- The area of a triangle formed by the coordinate axes and the line  $2x - 5y = 20$  is
- The slope of the line perpendicular to the line joining  $(-4, 2)$  and  $(-14, 4)$  is
- What is the angle formed by a line drawn from the origin to a point  $(2, 2)$  with the positive  $x$ -axis?

5. Two points  $A$  and  $B$  are 5 units apart. How many straight lines can be drawn that are at a distance of 2 units from  $A$  and 3 units from  $B$ ?

6. What is the  $x$  intercept of the line represented by the equation  $4x + 3y = 12$ ?

7. What is the slope of the line represented by the equation  $4x + 3y = 12$ ?

8. What is the  $y$ -intercept of a line with  $x$  intercept 3 and slope  $-1$ ?

9. For what value of ' $k$ ' will the pair of lines  $2x + 3y = 12$  and  $kx + 12y = 30$  NOT intersect each other at any point?

10. If the line  $2x + by = 12$  is parallel to the line  $-x + 4y = 8$ , then what is the value of  $b$ ?

### Exercise No. 4

*Directions: Compare Column A with Column B, using additional information, if given and select from one of the following four answer choices.*

- A. Column A is greater.
- B. Column B is greater.
- C. The two columns are equal.
- D. The relationship cannot be determined from the information given.

1. Given two straight lines  $x + y = 10\sqrt{2}$  and  $x + y = 6$ .

Column A	Column B
Shortest distance between the lines	$4\sqrt{2}$

2. The centroid of a triangle with vertices  $(1, 2)$ ,  $(-2, 4)$ , and  $(a, b)$  is  $(2, 2)$ .

Column A	Column B
Sum of $a$ and $b$	8

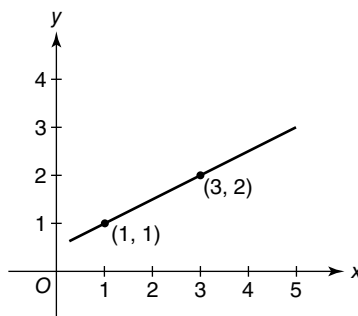
3. The equation of a line is given by  $x - 3y = 0$ .

Column A	Column B
Slope of a line parallel to the given line	0

4.  $2x + 3y = 6$ .

Column A	Column B
$Y$ -intercept of the line	$X$ -intercept of the line

5.



Column A	Column B
Absolute value of $x$ -intercept	Absolute value of $y$ -intercept

6. **Column A**  
The  $y$ -intercept of a line given by the equation  $y = (3/2)x - 6$ .

**Column B**  
The  $x$ -intercept of a line given by the equation  $y = (1/4)x + 4$ .

7. Tommy started at the base of a hill which is 0 ft. above sea level. He knows that the hill rises along a line with a slope of  $\frac{2}{5}$ . He also knows that he has to walk 100 feet horizontally to get to the peak.

**Column A**

35 ft. above sea level

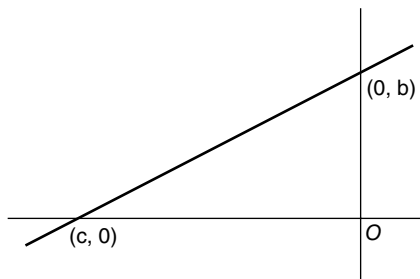
**Column B**

The vertical elevation of the peak of the hill

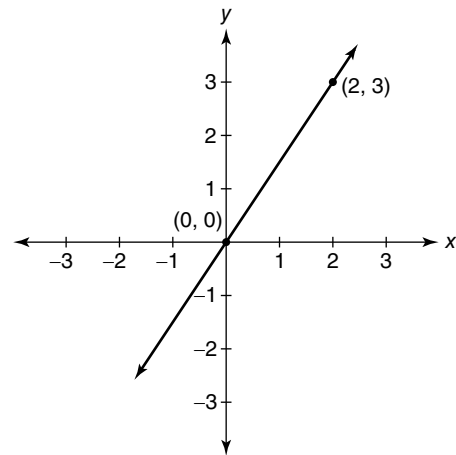
8. Two lines  $L$  and  $M$  are perpendicular to each other. Line  $L$  passes through  $(1, 1)$  and  $(2, 2)$ .

**Column A**Slope of line  $L$ **Column B**Slope of line  $M$ 

9. The line  $y = ax + b$  is drawn on the rectangular coordinate axes.

**Column A** $a$ **Column B** $\frac{-b}{c}$ 

10.

**Column A**

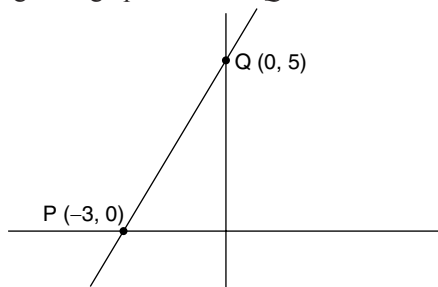
The slope of the line in the graph

**Column B** $\frac{3}{2}$ 

### Exercise No. 5

**Directions for Questions 1–5:** Select the correct option from the choices that follow each question.

1. What are the maximum number of points of intersection of 5 distinct lines?  
(A) 4 (B) 5 (C) 6 (D) 10 (E) 12
2. Which of the following is the equation of the line passing through points  $P$  and  $Q$  shown below?



(A)  $y = \frac{-5}{3}x - 3$

(D)  $y = \frac{5}{3}x - 5$

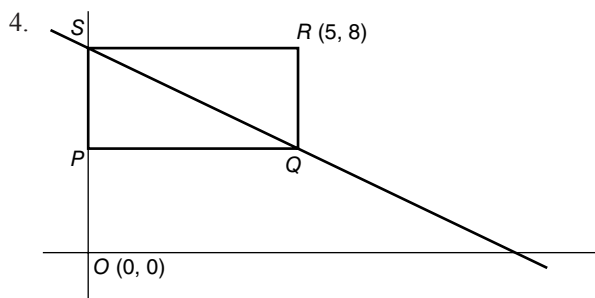
(B)  $y = 3x + 5$

(E)  $y = \frac{-5}{3}x + 5$

(C)  $y = \frac{5}{3}x + 5$

3. What is the area of a triangle with vertices  $(2, 11)$ ,  $(4, 2)$  and  $(-3, 2)$ ?

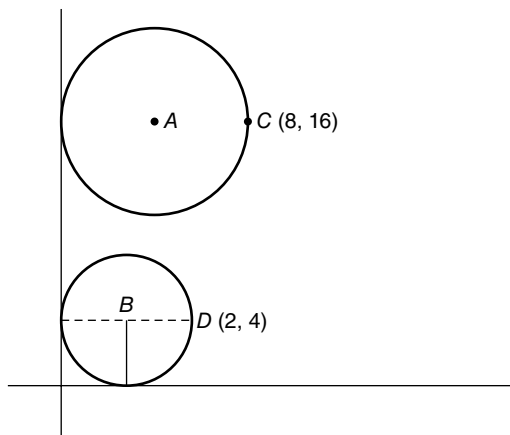
(A) 27.5 (B) 31.5 (C) 33.5 (D) 38 (E) 45.6



In the figure above, PQRS is a rectangle and the equation of the line SQ is  $5y + 4x = 40$ . What is the area of the rectangle PQRS?

- (A) 10 (B) 15 (C) 20 (D) 25 (E) 30

5. In the  $xy$  plane, points  $A$  and  $B$  are the centers of two circles and  $y$ -axis is the tangent to both the circles.  $C$  and  $D$  are two points farthest from the  $y$ -axis on the two circles. Find the slope of the line joining  $\overline{AB}$ .



- (A) 3 (B) 4 (C) 5 (D) 6 (E) 7

**Directions for Questions 6–10: Compare Column A with Column B, using the additional information if given. Select one of the following four answer choices.**

- A. Column A is greater.  
B. Column B is greater.

- C. The two columns are equal.  
D. The relationship cannot be determined from the information given.

6. 

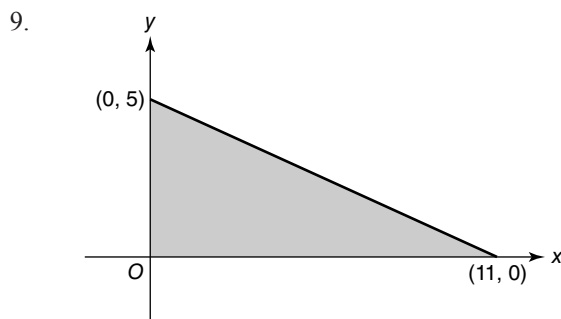
<b>Column A</b>	<b>Column B</b>
The $y$ -intercept of a line defined by the equation	The $y$ -intercept of a line defined by the equation
$y = \frac{3}{2}x - 6$	$y = -\frac{1}{4}x + 4$

7. A line is represented by the equation  $y = 3x + 2$ .

- |   |                                      |
|---|--------------------------------------|
| <b>Column A</b>                                       | <b>Column B</b>                      |
| The slope of the line perpendicular to the given line | The $x$ -intercept of the given line |

8. In the rectangular coordinate system, a circle with center  $P$  is tangential to both the  $x$ -axis and the  $y$ -axis.

- |                            |                            |
|----------------------------|----------------------------|
| <b>Column A</b>            | <b>Column B</b>            |
| The $x$ -coordinate of $P$ | The $y$ -coordinate of $P$ |



- |                                    |                                    |
|------------------------------------|------------------------------------|
| <b>Column A</b>                    | <b>Column B</b>                    |
| Half the area of the shaded region | The perimeter of the shaded region |

10. Points  $P$ ,  $Q$ , and  $R$  have coordinates  $(0, 8)$ ,  $(4, 0)$ , and  $(0, -3)$  respectively.

- |                                  |                 |
|----------------------------------|-----------------|
| <b>Column A</b>                  | <b>Column B</b> |
| The perimeter of $\triangle PQR$ | 25              |

# CHAPTER 22

## Data Analysis

### **Data Analysis**



#### **Tips**

Tables and graphs help present complicated information so that it can be understood with ease.

The questions on the *GRE*<sup>®</sup> include the concepts of application and analysis of data, which are given as data analysis questions. The basic concepts of statistics, such as mean, median, mode, range, standard deviation, percentile, quartile deviation, and normal distribution, are used in the interpretation of data given in tables and graphs, such as bargraphs, linear graphs, pie graphs, tabular analysis and frequency distribution, by using methods such as counting, permutations and combinations, and probability distribution.

### **Data Interpretation**

The graphical method of describing data in an organized manner using a variety of methods is observed in different forms of representation. In data interpretation, as the name suggests, questions are based on data (information) presented, usually in the form of tables, charts or diagrams.

#### **Strategies for Solving Data Interpretation Questions**

Before you attempt a question, read the title to get a general idea of what the information is about. Read the question carefully to notice if percent change or change in percent is discussed, since both DO NOT mean the same thing.

*Example:* If the discount on an article is increased from 10% to 20%, the increase in percent is  $\frac{20-10}{10} \times 100 = 100\%$ . However, the increase in the amount is only 10 ( $20 - 10 = 10$ ).

Data interpretation problems on the *GRE*<sup>®</sup> do not require you to perform calculations to find the exact value. You can calculate the approximate value and find the correct answer. On the test, the graph and its related information are displayed on the left side of the screen while the question appears on the right side.

## Tables

Tables are the simplest ways of presenting information; numbers in particular. Normally, data interpretation questions have a caption above the table to help you understand what the information is about. The data may be presented in rows and columns. The units needed for calculations are usually indicated at the top of the table; however, at times it is also mentioned as a footnote.

*Example:* **Percentage of students who graduated from Sheridian College over the last five years.**

	2006	2007	2008	2009	2010
<b>Science</b>	89	86	87	88	89
<b>Engineering</b>	91	90	92	88	89
<b>Humanities</b>	72	69	67	70	71
<b>Business studies</b>	79	73	72	76	78
<b>Fashion designing</b>	68	72	70	69	68



### Tips

When answering questions based on tables/graphs, read carefully the title and the column headings. The title of the table will give you a general idea about the type of question and also the purpose of the information provided.

## Graphs

In tables, the exact numbers are mentioned, whereas in graphs, the data presented is general in nature and indicates approximate values. Graphs are generally of six types:

1. Bar graphs.
2. Histograms.
3. Cumulative bar graphs.
4. Line graphs.
5. Pie charts.
6. Combination graphs.

### 1. Bar Graphs

In bar graphs or bar charts, a few parallel bars of different lengths are shown adjacent to each other. Data is typically represented using  $X$  and  $Y$  coordinates in the form of bars and individual values are represented by these bars.

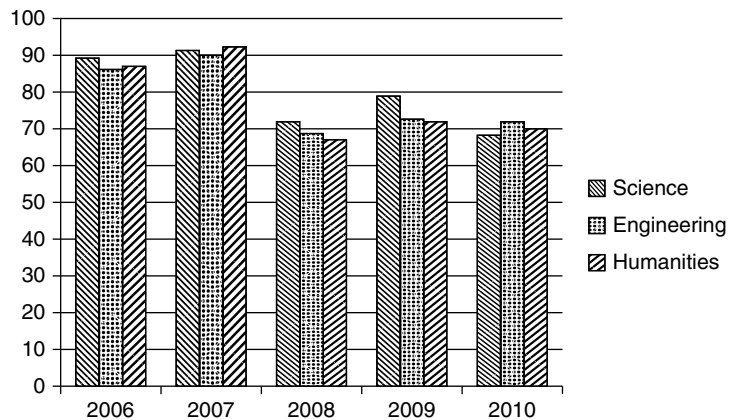
The percentage of students who graduated from Sheridian College over the last five years from various fields of study can be represented with the help of bar graphs.

*Example:* Percentage of students who graduated from Sheridian College over the last five years.



### Tips

A bar graph can have either vertical or horizontal bars. You can compare among different quantities or the same quantity at different times by mere visual inspection.



## 2. Histograms

Histograms are a variant of bar graphs and are used when the data represented is continuous. In a histogram, the bars are stacked adjacent to each other. In regular bar charts, the data represented is discrete (not continuous) and therefore, the bars or sets of bars are shown separately.

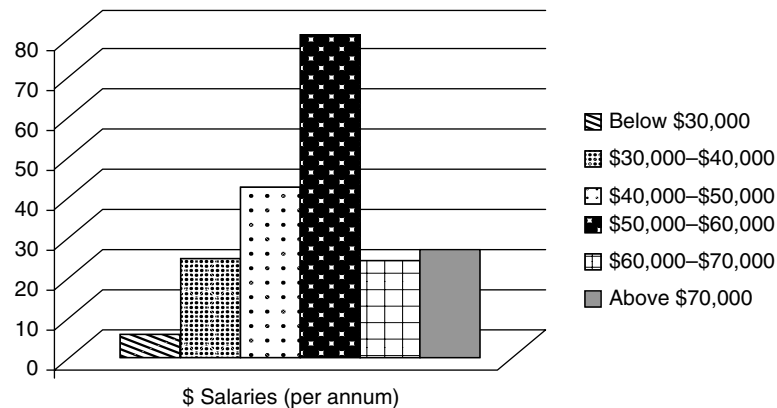


### Tips

A histogram represents continuous data sorted into categories.

In the previous graph about Sheridian College graduates, data pertaining to 2006, 2007, 2008, 2009, and 2010 is indicated separately. This is an example of a discrete bar chart.

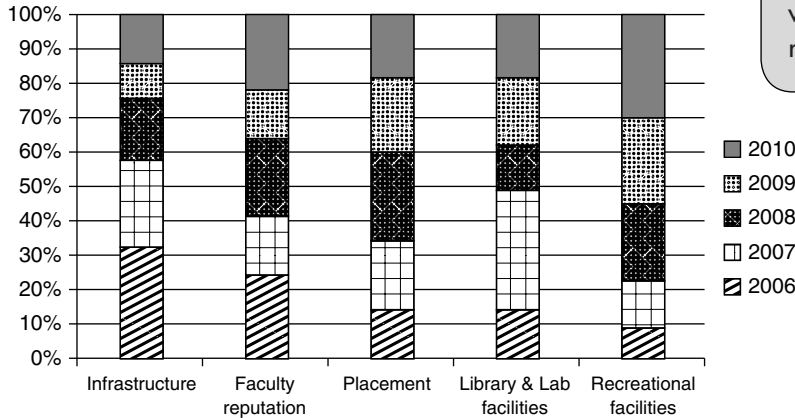
Note that bar charts can be shown with the bars clustered together or set apart. In histograms, the bars are never apart; they are invariably placed adjacent to each other and represent continuous data.



## 3. Cumulative or Stacked Bar Graphs

Normally, given data is represented by a single bar graph. In cumulative graphs, data pertaining to different bar graphs is combined and represented by a single bar.

*Example:* In a survey, students rated a college on five parameters: Infrastructure, faculty reputation, placement, library and laboratory facilities, and recreational facilities. The survey was conducted every year, from 2006 to 2010. The rating given by the students can be represented in the form of a cumulative bar chart as indicated below.



**Tips**  
Critical value:  
The value of a computed statistic used as a threshold to decide whether the null hypothesis will be rejected is called Critical value.

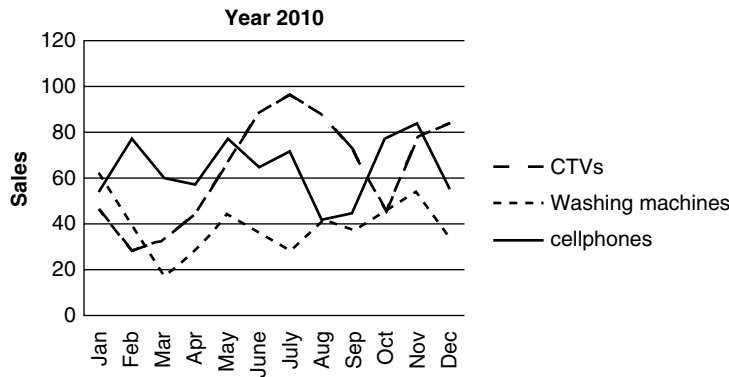
#### 4. Line Graphs

In line graphs, points denoting particular values are connected. The lines thus formed indicate a trend or change in value when compared to the previous value.

*Example:* A company sold 5 tons of cement in the first month, 4 tons in the second, 9 tons in the third, and so on. The sales trend can be shown in the form of a line graph.

In a nutshell, line graphs represent the relationship between two correlated quantities.

*Example:* The sales of DRAGON brand color televisions, washing machines, and cell phones (in thousand units) can be shown with the help of a line graph. Here, the variation in sales for each month of 2010 is shown below:



**Tips**  
Line graphs are used to show changes in quantity.  
If a line has an upward slope, then it represents an increase in value.  
If a line has a downward slope, then it represents a decrease in value.



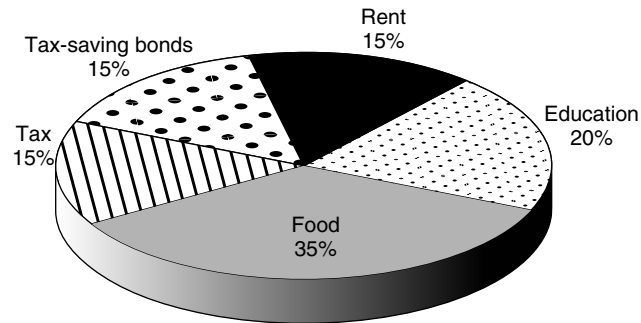
## 5. Pie Charts

In circle graphs or pie charts, a circle containing several sectors is shown. Each sector indicates a particular value, usually expressed as a percentage. A household spends 15% of the income on rent, 20% on children's education, 35% on food, 15% on tax, and 15% on tax-saving bonds. These values can be represented in the form of a pie chart.

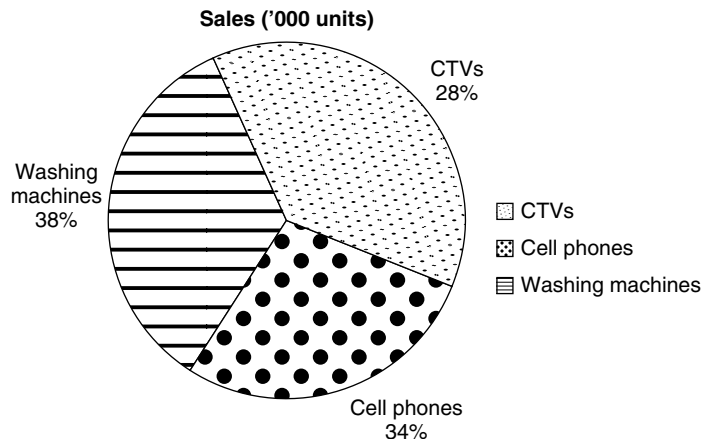


### Tips

Circle graphs are used to show the relationship between various sectors and the total. Circle graphs are often used to represent the data in the form of sectors.



*Example:* A pie chart is best suited to indicate the relative share, or 'pie' or 'slice'. For example, if the management of DRAGON wants to know the relative share of CTVs, washing machines, and cell phones as a percent of the total sales for January 2010, then a pie chart is ideal. DRAGON sold 46,000 CTVs, 62,000 washing machines, and 55,000 cell phones in January, 2010. The relative shares of these products can be represented in the form of a pie chart.



## 6. Combination Graphs



### Tips

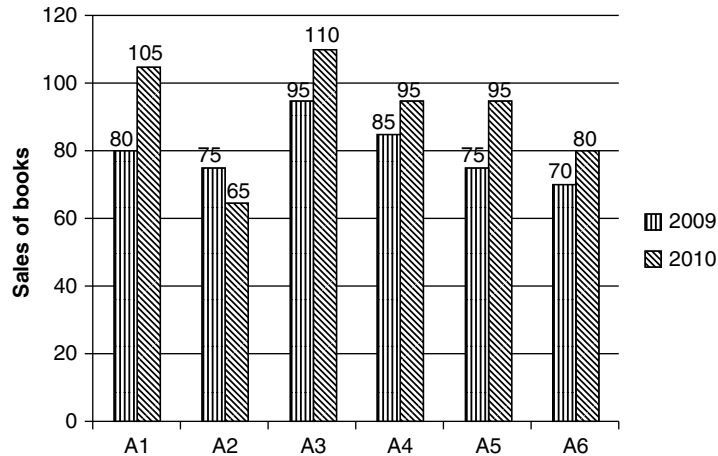
In a combination graph, data can be represented in a single graph or in two different graphs.

In combination graphs, data from more than one type of graph may be represented in the same graph.

## PRACTICE EXERCISES

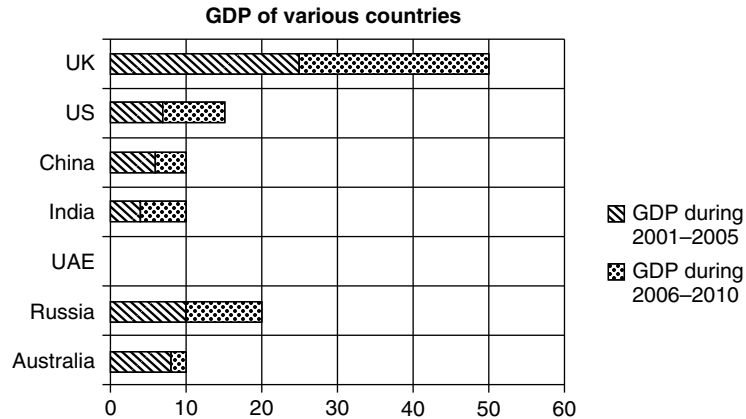
## Exercise No. 1

- I. The bar graph given below shows the sales of books by stores A1, A2, A3, A4, A5, and A6 during the years 2009 and 2010.



- What is the ratio of the total sales of A2 to the total sales of A4 during the two years?  
(A) 2:3 (B) 3:5 (C) 4:5 (D) 7:9 (E) 9:7
- By what percent do the average sales of A5 differ from the combined sales of A2 and A6 for both the years? (Enter your answer in the box rounded to the 1st decimal place).  
 %
- The average sales of A1, A2, and A6 for 2009 is what percent of the average sales of A1, A2, and A3 for 2010? (Enter your answer in the box rounded to the 1st decimal place).  
 %
- What are the approximate average sales of all the branches in both the years? (Enter your answer in thousands).
- The sales of how many branches increased by more than 10% between 2009 and 2010?

II. The following chart represents the GDP of different countries during two periods, 2001–2005 and 2006–2010. All figures are in \$ billion.



6. Which of the countries accounted for the maximum percent increase in GDP during the two periods?

- (A) UAE (C) India (E) Australia  
(B) US (D) China

7. The GDP of UAE is what percent of the GDP of both the UK and Russia for the decade? (Enter your answer rounded to the nearest integer).

%

8. Which of the countries accounts for the highest GDP during the period 2001 to 2005?

- (A) Russia (C) India (E) Australia  
(B) China (D) UAE

9. Out of every \$10,000 spent during 2001–2010, approximately how much was the GDP of China during 2001–2005?

- (A) \$4,000 (C) \$6,200 (E) \$8,000  
(B) \$5,000 (D) \$7,200

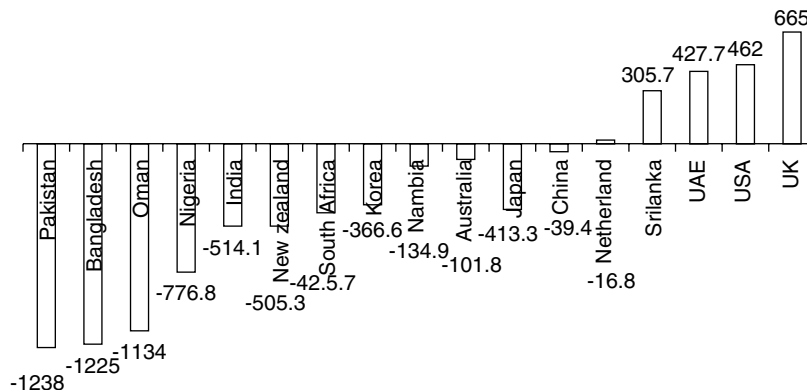
10. How many countries had approximately the same GDP during the two periods?

- (A) 1 (B) 2 (C) 3 (D) 4 (E) 5

### Exercise No. 2

I. The trade deficit of the first three highest trade deficit countries is \$3597 billion. The trade deficit of the next five highest trade deficit countries is \$2635.2 billion. The trade deficit of the remaining countries is \$659.5 billion.

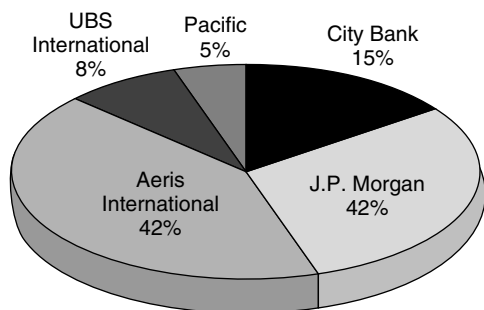
Trade Deficit/Surplus of countries for the year 2006 and 2007 (All figures in billion dollars).



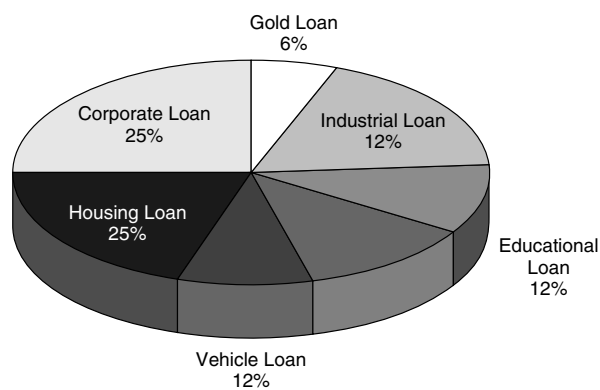
- The approximate ratio of the difference between the highest and the lowest surpluses of the countries to the difference between the deficits of Bangladesh and Oman is  
(A) 1:4 (B) 2:3 (C) 4:1 (D) 3:2 (E) 4:3
- What is the average deficit of the five countries that would be in the mid-level, if the deficits are represented in either an increasing or a decreasing order?
- Among the four countries with a surplus, what approximately, is the difference between the average surplus of the two countries with a maximum surplus, and the average surplus of the remaining countries?  
(A) 100 (B) 150 (C) 175 (D) 200 (E) 225
- The ratio of the total deficit of the 5 highest deficit countries to that of the deficit of all the deficit countries.  
(A) 0.62 (B) 0.71 (C) 0.80 (D) 0.85 (E) 0.95
- The total deficit of all the countries combined, to the nearest tens place is

**Directions:** Question Numbers (6 – 10) are based on the two pie charts shown below and the information given here.

The Central Bank of America has disbursed an amount of \$150,000 million to a few banks in the United States to issue loans.



**Distribution (in percent) of amount disbursed in the form of loan is represented below.**

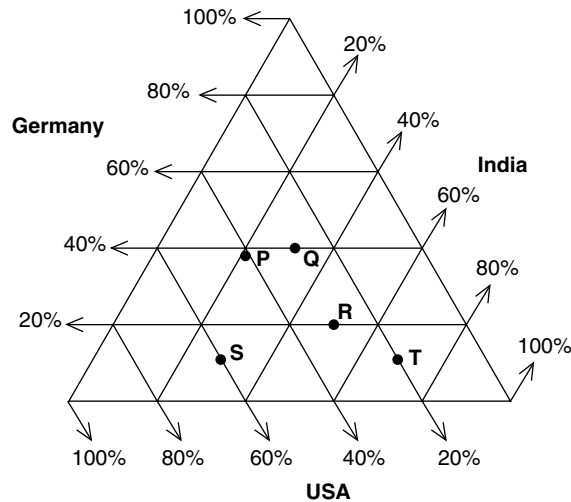


- By what percentage is the amount issued to the City Bank greater than the amount issued to the Pacific Bank?  
(A) 10% (C) 100% (E) 200%  
(B) 30% (D) 150%
- What is the difference between the percent of amount issued to Aeris and the percent of amount issued to JP Morgan?  
(A) 12% (C) 30% (E) 42%  
(B) 28.5% (D) 40%
- What is the total amount disbursed (in million dollars) for housing loans by the City Bank?  
(A) \$2250 (C) \$20000 (E) \$45000  
(B) \$4500 (D) \$22500
- By how much is the amount given by the City Bank for education loans greater than the amount issued for corporate loans by the Pacific Bank? (In million dollars).  
(A) \$375 (C) \$7500 (E) \$40,000  
(B) \$3750 (D) \$37,500
- Which of the following statements must be true? (Indicate all possible answers).  
(A) The amount issued for gold loans by the UBS International bank is greater than the amount issued for vehicle loans by the Pacific Bank.  
(B) 1/10th of the total amount was issued for education loans.  
(C) The amount issued for education loan by J.P. Morgan is greater than the amount issued for housing loan by the City Bank.

### Exercise No. 3

I. *P, Q, R, S, and T* are companies, with offices in India, the USA, and Germany.

The following figure gives the percentage distribution of sales of each company through their branches in different countries.



Sales and other details of the five companies (in million \$ US)

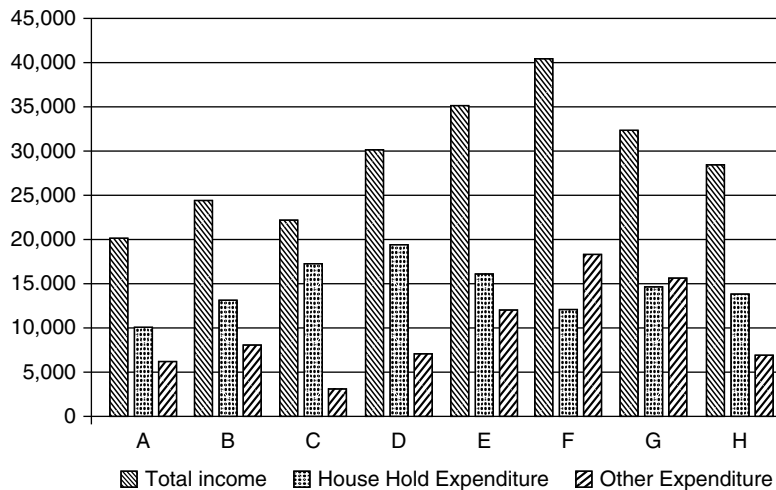
	P	Q	R	S	T
Sales	2500	3000	1500	3500	2400
Expenses	1700	2400	1100	2700	1600
Taxes	240	320	160	380	230

Gross profit = Sales – Expenses.

Net Profit = Gross Profit – Taxes.

- In Germany, by what percent are the sales of company *P* lesser than the sales of company *Q*?  
 (A) 15.66% (C) 18.63% (E) 23.56%  
 (B) 16.66% (D) 21.25%
- Find the number of countries with a ratio of expense to gross profit greater than 2.  
 (A) 1 (B) 2 (C) 3 (D) 4 (E) 5
- In the USA, by what percent are the sales of company *Q* greater than the sales of company *R*?  
 (A) 20 (B) 40 (C) 60 (D) 80 (E) 100
- For a company *R* in India, by what percent does its gross profit differ from that of its net profit?
- Which of the following statements must be true?  
 (I) In India, the sales of company *S* are more than the sales of company *R*.  
 (II) For company *R*, the sales in the USA are the least.  
 (III) The sales of company *P* in Germany are less than 50%.  
 (A) Only I (D) Only II and III  
 (B) Only II (E) Only I and III  
 (C) Only III

II. The following data gives information on monthly income, household expenditure, and other expenditure of eight families.



Saving = Total Income – (household expenditure + other expenditure).

$$\text{Percent saving} = \frac{\text{Saving}}{\text{Total Income}} \times 100.$$

- |   |   |
|---|---|
| <p>6. Which of the following families has the highest percent of savings?<br/>(A) B (B) D (C) E (D) G (E) H</p> <p>7. How many families save more than 10 percent of their income?<br/>(A) 4 (B) 5 (C) 6 (D) 7 (E) 8</p> <p>8. What is the maximum difference between household expenditure and the other expenditure for any family?</p> | <p>(A) 12,000 (C) 13,000 (E) 14,000<br/>(B) 12,500 (D) 13,500</p> <p>9. Find the number of families with household expenditure between 40% and 60% of their total income.<br/>(A) 3 (B) 4 (C) 5 (D) 6 (E) 7</p> <p>10. Which family has the highest percent of other expenditure compared to its savings?<br/>(A) H (B) G (C) F (D) D (E) B</p> |
|---|---|

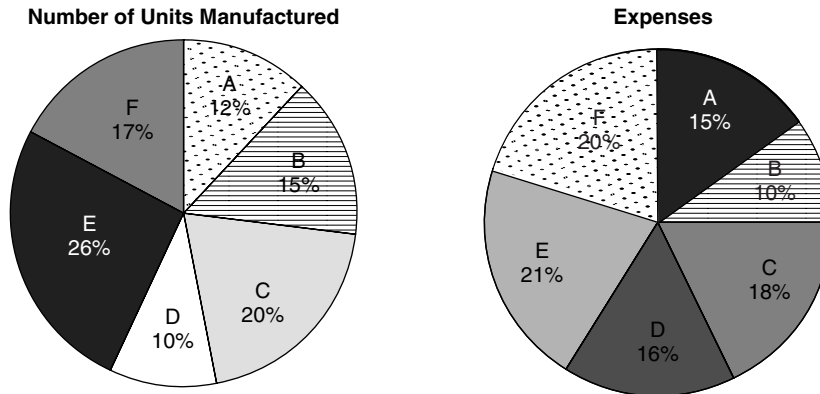
**Exercise No. 4**

Column	P	Q	R	S	T
A	700	850	800	900	750
B	850	660	700	590	680
C	800	720	540	810	670
D	650	830	650	740	800
E	900	900	850	900	800
F	800	910	720	740	680
G	750	800	760	840	790
H	600	760	680	730	800
I	700	820	860	770	690
J	900	800	800	950	900

P, Q, R, S, and T are companies that have ranked 10 colleges A, B, C, D, E, F, G, H, I, and J. The ranking given is based on the total points of all the companies. If the ranking received by two colleges is the same, then the scoring given by 'P' is given a priority. In spite of this, if the ranking remains the same, then the scoring given by 'Q' is given a priority and the iteration continues.

- |  |   |
|--|---|
| <ol style="list-style-type: none"> <li>Which college is at the 5th position?<br/>(A) C (B) D (C) E (D) F (E) G</li> <li>Find the difference between the average scoring of the colleges in the 1st and the 2nd position.<br/>(A) 0 (B) 50 (C) 100 (D) 200 (E) 250</li> <li>Which college is placed at the 6th position from the bottom?<br/>(A) C (B) E (C) F (D) G (E) I</li> </ol> | <ol style="list-style-type: none"> <li>How many colleges were given the same scoring by both <i>P</i> and <i>R</i>?<br/>(A) 5 (B) 4 (C) 3 (D) 2 (E) 1</li> <li>Approximately by what percent is the total points of the 7th ranked college less than the average points of both the 8th and the 3rd ranked colleges?<br/>(A) 3% (C) 7.75% (E) 9%<br/>(B) 5.25% (D) 8.25%</li> </ol> |
|--|---|

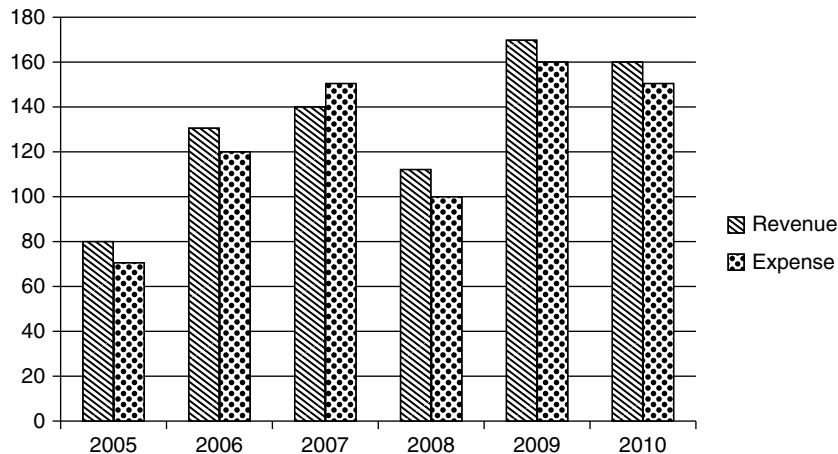
II. Company PQR manufactures products A, B, C, D, E, and F. The following pie chart gives the percent breakup of the number of units of each product manufactured and the total expenditure incurred to manufacture that product.



- |   |  |
|---|--|
| <p>6. Which product incurs the highest expenditure per unit to manufacture?<br/>(A) E (B) D (C) C (D) B (E) A</p> <p>7. How many products incur an expenditure more than the average expenditure for all products?<br/>(A) 1 (B) 2 (C) 3 (D) 4 (E) 5</p> <p>8. How many products have a higher per unit expenditure than product E?<br/>(A) 1 (B) 2 (C) 3 (D) 4 (E) 5</p> | <p>9. How many products have a per unit expenditure lesser than the average per unit expenditure for all products?<br/>(A) 1 (B) 2 (C) 3 (D) 4 (E) 5</p> <p>10. The expenditure for manufacturing each unit of A is what percentage of the expenditure for manufacturing each unit of B?<br/>(A) 87.5% (C) 162.5% (E) 200%<br/>(B) 112.5% (D) 187.5%</p> |
|---|--|

### Exercise No. 5

I. Revenue and Expense of a company (in \$billions)





- |   |   |
|---|---|
| <p>1. For how many years was the expense greater than the revenue?<br/>(A) 5 (B) 4 (C) 3 (D) 1 (E) 0</p> <p>2. For how many years was the revenue at least 10% more than the expense?<br/>(A) 1 (B) 2 (C) 3 (D) 4 (E) 5</p> <p>3. In which year did the company have the highest profit percent?<br/>(A) 2005 (C) 2008 (E) 2010<br/>(B) 2006 (D) 2009</p> | <p>4. In which year did the company have the highest profit?<br/>(A) 2005 (C) 2007 (E) 2009<br/>(B) 2006 (D) 2008</p> <p>5. What is the average growth rate in revenue for the given period since 2005 through 2010?<br/>(A) 12 (B) 15 (C) 18 (D) 20 (E) 22</p> |
|---|---|

**II. University A, B, C, D, and E are the top five universities to offer a graduate degree.**

*The requirements of each university are as follows:*

- (I) *University A: A student should have a minimum GPA of 3.5 in the undergraduate program and should have scored 1350 in the GRE®.*
- (II) *University B: A student should have a minimum GPA of 3.4 in the undergraduate program and should have scored 1300 in the GRE®.*
- (III) *University C: A student should have a minimum GPA of 3.2 in the undergraduate program and should have scored 1400 in the GRE®.*
- (IV) *University D: A student should have a minimum GPA of 3 in the undergraduate program and should have scored 1450 in the GRE®.*
- (V) *University E: A student should have a minimum GPA of 3.5 in the undergraduate program and should have scored 1400 in the GRE®.*

*Undergraduate GPA of 10 students and their respective GRE® scores.*

	GPA in Graduation	GRE® Test Score
1	3.0	1250
2	3.2	1300
3	2.6	1350
4	3.5	1300
5	3.9	1450
6	3.6	1400
7	2.8	1520
8	2.4	1370
9	3.4	1420
10	3.7	1100

- 
- |   |   |
|---|---|
| <p>6. How many students can apply to all the five universities?<br/>(A) 0 (B) 1 (C) 2 (D) 3 (E) 4</p> <p>7. How many students can apply to university E?<br/>(A) 0 (B) 1 (C) 2 (D) 3 (E) 4</p> <p>8. How many students are not eligible to apply to any university?<br/>(A) 2 (B) 3 (C) 4 (D) 5 (E) 6</p> | <p>9. How many students are eligible to apply to at least two universities?<br/>(A) 3 (B) 4 (C) 5 (D) 6 (E) 7</p> <p>10. How many students are eligible to apply to at least one university ?<br/>(A) 3 (B) 4 (C) 5 (D) 7 (E) 8</p> |
|---|---|

## Counting Methods

- *Counting Methods.*
- *Permutations & Combinations.*
- *Probability.*

## Formulae Cheat Sheet

### Statistics

- Average (Arithmetic Mean):  $\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$ , where  $x_i$  is the  $i$ th element of the set.
- Standard Deviation:  $\sigma = \sqrt{\frac{\sum_{i=1}^n (x_i - \bar{x})^2}{n}}$ .

### Combinatorics

- Permutations:  ${}^n P_k = \frac{n!}{(n-k)!} = k!({}^n C_k)$ .
- Combinations:  ${}^n C_k = \frac{n!}{(n-k)!(k)!} = \frac{{}^n P_k}{k!}$ .
- ${}^n C_k = {}^n C_{n-k}$
- Possible circular arrangements of  $n$  items:  $(n - 1)$ .
- Possible circular arrangements of  $n$  items, when the direction does not matter:  $\frac{(n-1)!}{2}$ .
- Possible linear arrangements of  $n$  items:  $n!$

### Probability

Probability of occurrence of an event =  $\frac{\text{Number of favorable outcomes}}{\text{Total number of possible outcomes}}$ .

The sum of probabilities of occurrence of all the events = 1.

Probability of non-occurrence of an event,  $P(\bar{E}) = 1 - P(E)$ .

Range of values of the probability of occurrence can be shown as  $0 \leq P(E) \leq 1$ .

1. Intersection of two independent events (Question type ‘and’)

$$P(A \cap B) = P(A)P(B)$$

2. Intersection of two dependent events (Question type ‘and’)

$$P(A \cap B) = P(A)P_A(B) = P(B)P_B(A)$$

where  $P_A(B)$  – probability of  $B$  when  $A$  has already occurred.

$P_B(A)$  – probability of  $A$  when  $B$  has already occurred.

3. Union of Two Overlapping Events (Question type ‘or’)

$$P(A \cup B) = P(A) + P(B) - P(A \cap B)$$

4. Union of Three Overlapping Events (Question type ‘or’)

$$P(A \cup B \cup C) = P(A) + P(B) + P(C) - P(A \cap B) - P(A \cap C) - P(B \cap C) + P(A \cap B \cap C)$$

## Statistics

The basics of descriptive statistics is to understand the statistical application of different measures of descriptions and deviations of the data. This includes all the concepts of distributions (such as frequency distribution, relative frequency distribution), measures of positions (such as quartiles and percentiles), measures of dispersion (such as range and standard deviation). To understand these concepts, the questions in the *GRE*<sup>®</sup> are mostly tested on mean, median, mode, range, standard deviation, etc., The statistics of data are basically calculated on a finite set of elements. So, it is good to recall the concepts of sets, averages progressions, etc.

### Sets

The collection of elements or the number of defined or undefined variables is termed as a set. A set can be a collection of finite or infinite elements.

*Example:* Set  $A = \{1, 2, 3, 4, 5\}$  is a finite set, whereas the set of natural number  $N$  is an infinite set.

*GRE*<sup>®</sup> normally deals with finite sets. In the finite set, the set of elements when arranged numerically (ascending or descending order), the elements may have a progression or may be randomly arranged.



#### Tips

The terms arithmetic mean and average are used synonymously.

### Arithmetic Mean

The arithmetic mean of a finite number of observations (terms) can be defined as the sum of all the observations in the set divided by the total number of observations in the set.

The formula for arithmetic mean is as follows:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

where  $x_i$  is the  $i$ th term of the set and  $n$  is the number of terms.

*Example:* If  $A = (28, 17, 22, 19, 23, 23)$ . The mean is

$$\frac{28+17+22+19+23+23}{6} = \frac{132}{6} = 22$$

### Determining Averages

The average of a set of numbers is calculated by adding the individual numbers and dividing the result by the number of numbers in the set. The method suggested below can be best used for smaller sets, thus increasing the speed of computation while reducing the probability of making errors. To find the average:

1. Assume an approximate value as the average.
2. Determine the deviation of each value from the assumed average.
3. Calculate the averages of the deviations obtained.
4. Add the average deviation to the assumed average.

*Example:* What is the average of 763, 781, 758, 777 and 775?

Assume 770 as the average. Now determine the deviations.

*Solution:*

$$\begin{aligned} 763 - 770 &= -7 \\ 781 - 770 &= 11 \\ 758 - 770 &= -12 \\ 777 - 770 &= 7 \\ 775 - 770 &= 5 \end{aligned}$$



#### Tips

If a set of elements is in arithmetic progression, then mean = median.

$$\text{Sum of the deviations} = -7 + 11 - 12 + 7 + 5 = 4.$$

$$\text{Correct average} = \text{Assumed average} + \text{Average of deviations}.$$

$$\begin{aligned} \text{Average deviation} &= 4/5 \text{ (where 5 is the number of numbers in the set)} \\ &= 770 + 4/5 = 770.8. \end{aligned}$$

*Example:* The average temperature of 6 days is 28° F. The temperature on the first five days is 29, 33, 23, 30, and 27 respectively. What is the temperature on the last day?

*Solution:* Let  $x$  be the temperature on the last day.

The average of the temperature of the six days

$$\begin{aligned} &= \frac{29 + 33 + 23 + 30 + 27 + x}{6} = 28 \text{ (given).} \\ \Rightarrow x &= 28 \times 6 - 142 = 168 - 142 = 26. \end{aligned}$$

## Median



### Tips

The numerical value of the mean and median in a set of elements need not be an element in the set, whereas the mode of a set is an element in the set.

When all the numbers in a set are arranged in increasing order, the middle number in the set is termed as the median.

In a set of  $n$  terms written in increasing or decreasing order,

- If  $n$  (number of terms in the set) is odd, then,

$$\text{Median} = \left( \frac{n+1}{2} \right)^{\text{th}} \text{ term.}$$

- If  $n$  is even, then,

Median = average of the two middle terms.

To calculate the median for the set  $A = (28, 17, 22, 19, 23, 23)$ , we need to arrange the elements from the smallest to the greatest number,  $(17, 19, 22, 23, 23, 28)$  is the rearranged set. Since there is an even number of elements, there are two values in the middle. Add the two middle numbers and divide by 2.

$$\text{Median} = \frac{22 + 23}{2} = 22.5$$

## Mode

The most frequently repeated element in a set of finite elements is termed as the mode of the set.

*Example:* For the set  $A = (28, 17, 22, 19, 23, 23)$ , the mode is 23.

**Note:** Every finite set has a mode. There can be more than one mode in a set.

*Example:* For the set  $B = \{28, 17, 22, 19, 23\}$  each element is a mode.

## Range

The difference between the largest and the least term in a set is termed as range.

In the set  $A = (28, 17, 22, 19, 23, 23)$

Range = Maximum value – Minimum value

$$28 - 17 = 11$$

## Quartile Deviation

The quartile deviation is half the difference between the third quartile ( $Q_3$ ) and the first quartile ( $Q_1$ ).

$$\text{Quartile deviation} = \frac{1}{2}(Q_3 - Q_1)$$

First, arrange the given observations in ascending order. All the values that are less than or equal to 25% of the scores belong to the first quartile ( $Q_1$ ) and the values that lie between 50% and 75% scores belong to the third quartile ( $Q_3$ ).

If the number of observations ( $N$ ) is even,

$$Q_1 = \left(\frac{N}{4}\right)^{\text{th}} \text{ value}; \quad Q_3 = \left(\frac{3N}{4}\right)^{\text{th}} \text{ value}$$

If the number of observations ( $N$ ) is odd

$$Q_1 = \left(\frac{N+1}{4}\right)^{\text{th}} \text{ value}; \quad Q_3 = \left(\frac{3(N+1)}{4}\right)^{\text{th}} \text{ value}$$

*Example:* Find the quartile deviation of the following data:

30, 65, 45, 25, 70, 55 and 50

*Solution:* Ascending order of the given observations

20, 30, 45, 50, 55, 65, 70

Number of observations is 7, which is odd, therefore

$$Q_1 = \left(\frac{7+1}{4}\right)^{\text{th}} \text{ value} = 2\text{nd value} = 30$$

$$Q_3 = \left(\frac{3(7+1)}{4}\right)^{\text{th}} \text{ value} = 6\text{th value} = 65$$

$$\begin{aligned} \text{Quartile deviation} &= \frac{65 - 30}{2} = \frac{35}{2} = 17.5 \end{aligned}$$



### Tips

Median is the average (mean) of a set of consecutive integers.



### Tips

$$SD = \sqrt{\frac{\sum_{i=1}^n (x_i - \mu)^2}{n}}$$

$x_i$  = each element in the set.

$\mu$  = mean of the set.

## Standard Deviation

Standard deviation is the measurement of the data values dispersed from the mean. A small standard deviation implies that the data values are very close to the mean and a high standard deviation implies that the data values are very far from the mean.

Consider the following two sets:

$$A = \{48, 49, 50, 51, 52\} \text{ and } B = \{30, 40, 50, 60, 70\}$$

The two sets have equal number of elements and their average is the same, but in set  $A$ , all the elements are closer to the mean while in set  $B$ , the elements are relatively far away from the mean. The measurement of this dispersion of data values on either side of the mean is called standard deviation. Notice that set  $A$  has a smaller standard deviation than set  $B$ .

The standard deviation of the elements, represented by ‘ $\sigma$ ’, is calculated by the formula

$$\sigma = \sqrt{\frac{\sum_{i=1}^n (X_i - \bar{X})^2}{n}}$$

- $\sum_{i=1}^n (X_i - \bar{X})^2$  is read as ‘For all the observations 1 to  $n$ , the sum of squares of the deviation of all the observations from the mean’.
- The symbol  $\sum$  represents the addition of all the elements in the set, ‘ $X_i$ ’ refers to the  $i^{\text{th}}$  term in the set.
- $\bar{X}$  refers to the mean and  $n$  refers to the number of elements in the set.

*Example:* Set  $A = (28, 17, 22, 19, 23, 23)$ , mean  $(\bar{X}) = 22$ .

$$x_1 = 17, x_2 = 19, x_3 = 22, x_4 = 23, x_5 = 23, x_6 = 28.$$

$n = 6$  terms.

$$\sigma = \sqrt{\frac{(17-22)^2 + (19-22)^2 + (22-22)^2 + (23-22)^2 + (23-22)^2 + (28-22)^2}{6}}$$

$$\sigma = \sqrt{\frac{(-5)^2 + (-3)^2 + (0)^2 + (1)^2 + (1)^2 + (6)^2}{6}}$$

$$\sigma = \sqrt{\frac{25+9+0+1+1+36}{6}} = \sqrt{\frac{72}{6}} = \sqrt{12} = 2\sqrt{3}$$



#### Tips

Deviation: It is the distance between points.

**Variance:** Square of standard deviation is known as variance

$$V = (S.D)^2$$

$$V = \frac{\sum_{i=1}^n (X_i - \bar{X})^2}{n}$$

## Practice Questions

1. Find the mean, mode, median, range, and standard deviation of the following sets:
  - (a) {2, 5, 8, 11, 20}
  - (b) {-3, 0, 6, 6, 9}
2. Given a set {3, 5, 16, 22,  $x$ }. Find the value of  $x$ , if the mean of the set is 10.

## Combinatorics

Combinatorics is a fancy word for counting. Combinatorics is mainly concerned with counting the outcome of different kinds of events under different constraints.

*Example:* How many different license plates can be made, if each license plate has 2 letters followed by 3 numbers?

This means that there are 26 ways in which the first and second positions can be filled, and 10 ways in which the third, fourth and fifth positions can be filled. So, the total number of ways to fill all the positions is

$$26 \times 26 \times 10 \times 10 \times 10 = (26)^2 (10)^3 = 676000$$



#### Tips

Two events are dependent if the outcome of one event affects the outcome of the other event.

On the other hand, what if the letters and the digits cannot be repeated? Then the first position can be filled using 26 letters, while the second position can be filled using 25 letters. The third, fourth and fifth positions can be filled using 10, 9 and 8 digits respectively. Hence, the total number of ways to fill all the 5 positions will be  $26 \times 25 \times 10 \times 9 \times 8 = 468000$ .

### Practice Questions

1. A newly formed country needs to design a flag and has decided upon a three-color design. It has five colors to choose from: Blue, green, yellow, white, and red, and no color can be used more than once. How many different designs can be created?
2. In how many ways can a straight flush be dealt, if two of the cards originally dealt must be discarded and replaced, but not if all the 5 cards are clubs? (A flush is a set of cards of one suit).
3. A dice is rolled three times. How many different results are possible (without repetition)?
4. You have four friends but only two extra tickets for a concert. In how many ways can the tickets be distributed, if you want to take at least two friends to the concert?
5. On a one-day expedition to Manhattan, the tour guide asks you to choose from among five, ten, and twenty restaurants for breakfast, lunch and dinner, respectively. How many different restaurant combinations can be created?



#### Tips

In a set of finite number of elements, if the range increases, the standard deviation also increases.

### Permutations

In mathematics, permutation implies arranging and rearranging the given things in a particular order. It is essential to note that in problems on permutation, the order is important, unlike in combinations where the order is not important.

#### Basic Rules for Permutations

If two events occur in  $m$  and  $n$  different ways, respectively, then the total number of ways in which the two events can occur is  $m \times n$ .

Similarly, if three events occur in  $m$ ,  $n$  and  $p$  different ways, the total number of ways in which the three events can occur is  $m \times n \times p$ .

Assume that there are ' $n$ ' number of items and ' $r$ ' different ways of selecting them.

- If repetition is not allowed, the number of permutations  $= {}^n P_r = \frac{n!}{(n-r)!}$
- If repetition is allowed, the number of permutations  $= n!$
- The number of permutations of  $n$  objects where  $P_1$  objects are of the same type  $= \frac{n!}{P_1!}$
- The number of permutations of  $n$  objects where  $p_1$  objects are of one kind,  $p_2$  are of a second kind,  $p_3$  objects are of a third kind and so on,  $= \frac{n!}{p_1! p_2! p_3! \dots p_k!}$



#### Tips

Steps to find the standard deviation of  $n$  numbers:

1. Find the arithmetic mean.
2. Find the difference between the mean and each of the  $n$  numbers.
3. Square each of the differences.
4. Find the average of the squared differences.
5. Find the square root of this average.



*Example:* Find the number of ways in which 5 books can be arranged in 5 different rows.

*Solution:* The given question is the same as the question on permutation of 5 books in 5 different rows.

$${}^n P_r = \frac{n!}{(n-r)!}$$

$${}^5 P_5 = \frac{5!}{(5-5)!} = \frac{5!}{0!} = 5!, \quad \text{Note: } 0! = 1! = 1$$

$$\therefore 5! = 5 \times 4 \times 3 \times 2 \times 1 = 120$$

**Note:** The ‘exclamation mark’ is a symbol for a factorial.

$$n! = n \times (n-1) \times (n-2) \times \dots \times 3 \times 2 \times 1$$

The table below is a representation of the factorial values for the integers from 0 to 7. If a problem involves factorials of a large number, the answer is most likely retained in the factorial form.

$n$	0	1	2	3	4	5	6	7
$n!$	1	1	2	6	24	120	720	5040

*Example:* Find the number of ways in which 5 books can be arranged in 3 different racks, if each rack can take only one book.

*Solution:* Five books can be put in the first rack, four in the second, and three in the third. i.e.,  $5 \times 4 \times 3 = 60$ .

Using the formula,

$${}^5 P_3 = \frac{5!}{(5-3)!} = \frac{5!}{2!} = \frac{5 \times 4 \times 3 \times 2 \times 1}{2 \times 1} = 5 \times 4 \times 3 = 60$$

## Practice Questions

- How many three-digit number codes can be formed such that 0 is never in the hundreds place and an even number is never in the units place?
- On a museum wall, there are five places to hang paintings from ten available paintings. How many different arrangements are possible?
- In the finals of a 100-meter race, there are 8 contestants. The top two winners can win the gold and silver medals. In how many different ways can one gold, and one silver medal be given to the winners? (Assume that there is no tie between the two winners.)



### Tips

In questions on permutations, look for clue words that indicate arrangement. Arrangement means that a definite order has to be followed.

$n!$  is read as  $n$  factorial

$$n! = 1 \times 2 \times 3 \times \dots \times (n-1) \times n.$$



### Tips

Steps to find Multiple Event Probability

- Find the total number of possible outcomes.
- Find the number of desired outcomes.

## Combinations

A combination is defined as a selection of items from a larger group of items. In combinations, the order in which the items are selected from the group is not important. Simply put ‘There is no order in selection’.

The number of combinations of ‘ $n$ ’ things taken ‘ $r$ ’ at a time, also read as selecting ‘ $r$ ’ items from a group of ‘ $n$ ’ items, is obtained by the formula.

$${}^n C_r = \frac{n!}{r!(n-r)!}$$

**Example:** In how many ways can four job vacancies be filled by a group of seven candidates?

**Solution:** Seven people can fill the 1st vacancy in 7 ways, the remaining six people can fill the 2nd vacancy in 6 ways, the remaining 5 people can fill the 3rd vacancy in 5 ways. Finally, the remaining 4 people can fill the 4th vacancy in 4 ways. In all, the four vacancies can be filled in  $7 \times 6 \times 5 \times 4 = 840$  ways. Since the order of filling the vacant posts is important, this is a problem on permutation.

$${}^7P_4 = \frac{7!}{(7-4)!} = 7 \times 6 \times 5 \times 4 = 840$$

**Example:** How many 4-member committees can be formed from 7 people, if every person is equally eligible?

**Solution:** In forming a 4-member committee, the order is not important. This is a problem on combination.

$${}^7C_4 = \frac{7!}{(7-4)!4!} = \frac{7 \times 6 \times 5 \times 4}{4 \times 3 \times 2 \times 1} = 7 \times 5 = 35$$

The general formula for arranging  $k$  objects when you have  $n$  to choose from (when order does not matter) is

$${}^nC_k = \frac{n!}{k!(n-k)!}$$



#### Tips

In Permutations, the order matters. The number of permutations of ' $r$ ' objects from a set of ' $n$ ' objects =  $n!/(n-r)!$

## Practice Questions

- How many different teams of 4 can be formed from a group of 8?
- A tennis tournament begins with 16 players. How many different arrangements are possible for the semi-finals?
- If a team can be formed with 3 men and 3 women, and the teams can be selected from a group of 6 men and 5 women, then how many such different teams are possible?

## Sum Rule

The number of ways in which one object can be chosen from set  $A$  containing ' $m$ ' objects or from set  $B$  containing ' $n$ ' objects is the sum of the number of objects in set  $A$  and the number of objects in set  $B$ . i.e.,  $m + n$ . If only one option has to be chosen from the different sets, then this rule can be applied.

**Example:** A student has 10 long notebooks and 10 short notebooks. The number of ways he can choose a notebook =  $10 + 10 = 20$  ways.

## Product Rule

If job  $A$  can be done in ' $n$ ' ways and job  $B$  can be done in ' $m$ ' ways, then the jobs  $A$  and  $B$  together can be done in  $n \times m$  ways.

**Example:** A student has 10 long notebooks and 10 short notebooks. In how many ways can the student choose one long notebook and one short notebook?

**Solution:** The number of ways of choosing one long notebook = 10.  
The number of ways of choosing one short notebook = 10.  
Total number of ways =  $10 \times 10 = 100$  ways.



#### Tips

The probability that an event  $E$  occurs is represented by  $P(E)$ . If  $E$  is sure to occur, then  $P(E) = 1$ . If  $E$  will definitely not occur, then  $P(E) = 0$ .

*Example:* Find the number of ways in which the letters of the word SUCCESSFUL can be arranged.

*Solution:* The formula  $\frac{n!}{k_1!k_2!\dots k_n!}$  can be applied in this problem. The given word has 10 alphabets. Alphabet *S* is repeated 3 times, alphabet *C* is repeated 2 times and alphabet *U* is repeated 2 times. In the formula, '*n*' is the total number of objects and  $k_i$  is the number of objects of the  $i^{\text{th}}$  kind.

$$= \frac{10!}{3!2!2!}$$

## Practice Questions

1. Suppose you are Andy Warhol's assistant and you have generated 10 prints of a painting: 4 in red, 3 in blue, 2 in green, and one in chartreuse. You need to help Andy arrange the prints in a horizontal row. How many different arrangements are possible?
2. How many 3-digit odd numbers can be formed with an even number in the tens place and a prime number in the hundreds place?

## Circular Arrangements

Circular arrangements, also called circular permutations, involve arranging '*n*' objects in '*n*' places in a circular form. If '*n*' objects are to be arranged in circular arrangements, then the number of outcomes is  $(n - 1)!$



### Tips

To determine multiple-event probability, where each individual event must occur in a certain way, first figure out the probability for each individual event. Next, multiply the individual probabilities.

If '*n*' number of chairs are to be arranged around a table, the number of possible arrangements =  $(n - 1)!$  within the brackets matters and the number of possible arrangements =  $(n - 1)! / 2$  (when the order of arrangement does not matter).

*Example:* Find the number of ways in which 5 people can be seated around a dining table.

*Solution:* By the concept of the circular permutation, 5 people can be arranged in  $(5 - 1)! = 4! = 24$ .

## Practice Questions



### Tips

To determine multiple-event probability, where each individual event must occur in a certain way, first figure out the probability for each individual event. Next, multiply the individual probabilities.

1. In how many ways can 5 keys be arranged on a key chain?
2. A design for a new roulette wheel uses the numbers 1–20. How many arrangements can be made, if the numbers must alternately be odd and even? (Your answer should be in factorials).
3. In a conference, three countries are participating. Each country is represented by six diplomats. Three dinner tables are arranged, one for each country. In how many ways can all diplomats be seated ensuring that a country's diplomats are all seated at the same table? (Your answer should be in factorials).

4. There are three couples in a group of 10 friends. In how many ways can the friends sit in a row of 10 seats in a movie theater such that a couple always sits together?
5. A country's flag has to be designed with 5 colors: Red, green, blue, white, and yellow. Each color can be used only once. How many different arrangements are possible, if green and yellow cannot be adjacent to each other?

## Probability

Probability refers to the likelihood that an event will happen. It is the ratio of number of favorable events to the total number of possible events.

$$\text{Probability } (P) = \frac{\text{favorable events}}{\text{total number of events}}$$

Probability always lies on or between '0' and '1' i.e.,  $0 \leq P \leq 1$ .

## Terminology

### Mutually Exclusive Events

Two or more events are mutually exclusive, if all the events do not occur at the same time. When a coin is tossed, we either get heads or tails but not both. Therefore, getting heads or tails is a mutually exclusive event.

Other examples for mutually exclusive events are:

- Rolling out a '3' or a '5' when a dice is tossed.
- Dart player hitting a bull's eye and missing the bull's eye.

In mathematical terms, two events  $A$  and  $B$  are said to be mutually exclusive, if the probability of event  $A$  and event  $B$  occurring simultaneously is zero.

$$P(A \cap B) = 0$$

### Complementary Events

In two or more mutually exclusive events, complement of an event  $A$ , is the event in which event  $A$  does not occur. For example, when a dice is rolled, complement of getting an even number is the event of not getting an even number (getting an odd). When a dice is rolled, the number must either be even or odd. These are complementary events.

Mathematically, if two events  $A$  and  $B$  are complementary, the probability of  $A$  or  $B$  is 1.

$$P(A \cup B) = 1$$

Note that complementary events do not necessarily imply that the events are mutually exclusive. For example, if all the cars in a parking lot are either SUVs or red in color, this does not exclude the possibility of having a red colored SUV.



#### Tips

The basic rule of Probability: The probability that event  $A$  will occur = the number of outcomes that result in  $A$  divided by the total number of possible outcomes.

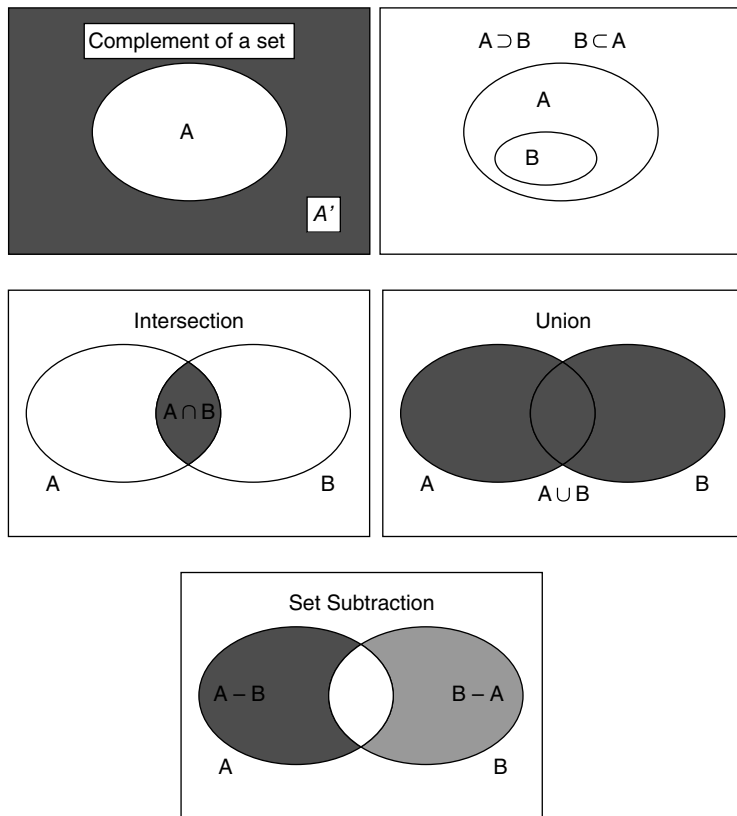
Venn Diagrams are helpful in understanding the concept of probability.



### Tips

The second Rule of Probability:  
The probability of occurrence of an event plus the probability of non-occurrence of the event = 1.

$$P(E) + P(\text{not } E) = 1.$$



Are the following events complementary, mutually exclusive, both, or neither?

1. Red or Black on a roulette wheel.
2. Red or Black when picking a card out of the standard 52-card deck.
3. Rejection by or admission to the business school of your choice.
4. Weather: Rain or Shine.
5. Weather: Hot or Cold.

### Dependent and Independent Events

Two events are independent if the outcome of an event does not influence the outcome of the events that follow. To illustrate independent events, assume that a coin is tossed ten times and the first nine times it is heads. The probability of obtaining a head or a tail the tenth time is  $\frac{1}{2}$ . The outcome of the tenth event is not influenced by the outcome of the previous events. Hence, these events are independent. If the outcome of an event is influenced by the outcome of the previous event, then the events are dependent.

When events are independent,  $P(A \cap B) = P(A)P(B)$ .

By extension  $P(A \cap B \cap C) = P(A)P(B)P(C)$ , and so on.

**Example:** If two cards are selected from a standard deck of cards, selecting a king the first time and selecting a red the second time are independent events.

The events of drawing a red card in the first trial and drawing another red card in the second trial after replacement of the first card are independent events. If a problem has the phrase ‘with replacement’, it implies that the events are independent because whatever was taken is replaced, restoring the original condition.

The events of drawing a red card in the first trial and drawing another red card in the second trial when the first card is not replaced are dependent events. If a problem has the phrase ‘without replacement’, it implies that the events are dependent because the conditions have changed and because the item removed has not been replaced.

**Tips**

The Third Rule of Probability: The probability of event A and event B represented by  $P(A \text{ and } B)$  is written as  $P(A) \times P(B)$ .

**Practice Questions**

1. Will the probability of rolling a ‘6’ on a dice depend on the previous throw? What is the probability of rolling two ‘sixes’ in a row?
2. What is the probability of getting three heads in a row when a coin is tossed?
3. What is the probability of drawing two kings in a row, if the first card is not replaced?
4. An urn contains 20 balls: 10 black and 10 white. What is the probability of drawing one black and one white ball, when the first ball taken out is not replaced?
5. What is the probability of drawing a black, even-numbered card from a deck of cards?
6. What is the probability of drawing a king or a black card?
7. Two credit card companies have sent you applications through mail. You know that the probability of being accepted by one or the other is 100%. The probability of being accepted by the first is 70%, and the probability of being accepted by both is 30%. What is the probability of being accepted by the second company?
8. A car dealer has 50 cars in the showroom. The probability of choosing a red car is 40%, the probability of choosing a convertible is 30%, and the probability of choosing a hybrid is 20%. The probability of the chosen car being a red, a convertible, or a hybrid is 48%. The probability that it is a red convertible is 20%, the probability that it is a convertible hybrid is 10%, and the probability that it is a red hybrid is 16%. How many red, convertible hybrid cars are there in the showroom?
9. What is the probability of rolling a total of ‘7’ with the two six-sided dice?
10. Assuming it is equally likely to dial any particular digit on a telephone, what is the probability that the first digit dialed is an odd prime number?
11. What is the probability of drawing a numbered card from a standard deck of cards?

**Tips**

The fourth Rule of Probability: The probability of occurrence of event A or occurrence of event B is the probability of occurrence of event A plus the probability of occurrence of event B minus the probability of occurrence of both events

$$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B).$$

## PRACTICE EXERCISES

## Exercise No. 1

**Directions:** Select all the options that are correct as per the information given in each question. Remember that one or more options may be correct.

- When  $30!$  is divided by  $3^k$  the remainder is 0. What could be the value of  $k$ ? (Indicate all possible values).  
 (A) 10 (C) 14 (E) 20 (G) 31  
 (B) 13 (D) 15 (F) 30
- Find the mode of the set formed by the remainders when all the odd numbers between 8 and 82 are divided by 5. (Indicate all possible values).  
 (A) 1 (E) 0  
 (B) 2 and 4 (F) 4  
 (C) 3 (G) Each element is a mode.  
 (D) 4 and 1 (H) There is no mode.
- There are 12 balls in a box. In how many different ways can 3 balls be chosen at random? (Indicate all possible answers).  
 (A)  ${}^{12}C_2$  (C) 220 (E) 110  
 (B)  ${}^{12}C_3$  (D)  $\frac{1}{3}{}^{12}C_3$
- A bag contains 8 red balls and 10 green balls. If two balls are selected at random, one after the other, what is the probability that one of the selected balls is red and the other is green? (Indicate all possibilities).  
 (A)  $\frac{{}^8C_1 \times {}^{10}C_1}{18C_2}$  (C)  $\frac{{}^8C_1 \times {}^{10}C_1}{18C_1 \times 18C_1}$  (E)  $\frac{{}^8C_1 \times {}^{10}C_1}{{}^8C_3}$   
 (B)  $\frac{{}^8C_1 \times {}^{10}C_1}{18C_1 \times 17C_1}$  (D)  ${}^8C_1 \times {}^{10}C_1$
- In a group of 300 people, 100 people speak English, and 250 people speak French. Which of the following are correct? (Indicate all correct answers).  
 (A) 50 people speak both English and French.  
 (B) There is no person who does not speak any of the languages.  
 (C) 100 people speak both the languages.  
 (D) 55 people speak neither of the languages.  
 (E) 60 people speak both the languages.
- Which of the following statements are correct? (Indicate all correct statements)  
 (A) For any natural number  $n, r$ ;  ${}^nP_r > {}^nC_r$   
 (B) ' $n$ ' coins are arranged in ' $a$ ' rows such that two coins are at the extreme ends of the row. The number of combinations that can be made is  $\frac{n!}{a!(n-a)!}$   
 (C) For any rational number  $n, r$ ;  ${}^nC_a > {}^nC_r$   
 (D)  ${}^nP_0 = 1$   
 (E)  $r = 1$ ;  ${}^nP_r = {}^nC_r$
- Which of the following does not equal to  ${}^9C_8$ ? Indicate all possible answers.  
 (A)  $\frac{9!}{8!(9-8)!}$  (C)  ${}^9C_1$  (E)  ${}^8C_7$   
 (B)  ${}^9P_8$  (D)  ${}^9C_0$
- Which of the following is true regarding the number of ways in which a 4-digit number can be arranged?  
 (A) The number of ways in which one digit is fixed and the other is arranged as  $4c_1 \times 4c_3$ .  
 (B) If there are four distinct non-zero integers, the no. of 4-digit numbers that can be arranged is  $4!$   
 (C) The number of ways in which the digits can be arranged, if the repetition is allowed, is  $4^4$ .  
 (D) The number of ways the digits can be arranged is  $4c_1$ .  
 (E) The digits in the number are arranged in a pattern.

9. How many 4-letter words can be formed from the word ROSE? (where repetition is not permitted).  
 (A)  $4!$ , if repetition is not permitted  
 (B)  $4^4 = 256$ , if repetition is permitted  
 (C) 45  
 (D)  $4^5$   
 (E)  $4^6$
10. How many five-lettered arrangements are possible using all the letters  $M, N, P, A,$  and  $E$ ? (Indicate all possible arrangements).  
 (A)  $4 \times 5$  (B)  $5^2$  (C)  $5^5$  (D)  $6^5$  (E)  $5!$

### Exercise No. 2

**Directions:** Select the correct option from the choices that follow the question.

1. A seminar hall has 6 doors. Find the number of ways in which a student can enter the room and leave the room through a different door.  
 (A) 11 (B) 12 (C) 30 (D) 36 (E) 6!
2. A football stadium has 6 different entry cum exit points. Jim enters the stadium and leaves the stadium three times. Find the number of ways in which he can do this, if he uses each point only once.  
 (A) 21 (B) 36 (C) 44 (D)  $6!$  (E)  $6^6$
3. A committee selected 11 members for a team. Find the number of ways in which the 11 members can be selected.  
 (A) 3628800 (C) 6406400 (E) 39916800  
 (B) 4604600 (D) 6735960
4. In a class of 825 students, the number of students who play hockey, baseball, and soccer are in the ratio of 3:2:4. If each person plays only one game, then what is the minimum number of students who do not play any of these games?  
 (A) 0 (B) 1 (C) 3 (D) 6 (E) 8
5. Which of the following has the greatest standard deviation?  
 (A)  $-1, -3, -5$  (D)  $-14, 0, +1$   
 (B)  $-4, -5, -6$  (E) 19, 20, 20.5  
 (C) 5, 6, 7
6. The buyer of a certain mechanical toy must choose 2 out of the 4 optional motions and 4 out of the 5 optional accessories. How many different combinations of motions and accessories are available, if the toy requires 1 motion and 2 accessories?  
 (A) 8 (B) 11 (C) 15 (D) 20 (E) 40
7. Find the number of ways in which 3 men and 3 women can be seated in a row such that all the men sit together?  
 (A)  $3!$  (C)  $3! + 4!$  (E)  $4! * 3!$   
 (B)  $4!$  (D)  $3! * 3!$
8. A company ships to a total of 15 distribution centers using color codes for each center. Either a single color or a pair of two different colors is chosen to represent each center. If each center is uniquely represented by one or two colors, what are the minimum number of colors needed for generating a color code? (Assume that the order of the colors in a pair does not matter.)  
 (A) 4 (B) 5 (C) 6 (D) 10 (E) 15
9. In a certain game, 50 questions need to be answered. The final score is calculated by subtracting twice the number of wrong answers from the total number of correct answers. If a player attempts all the questions and receives a final score of 35, how many answers did they answer incorrectly?  
 (A) 0 (B) 1 (C) 5 (D) 10 (E) 15
10. There are 6 boxes numbered 1, 2, 3, 4, 5, and 6. Each box is to be filled up either with a red or a green ball in such a way that at least 1 box contains a green ball and the boxes containing green balls are consecutively numbered. In how many ways can the boxes be filled?  
 (A) 5 (B) 21 (C) 33 (D) 60 (E) 65



**Exercise No. 3**

**Directions:** Write your answer to the given questions in the box(es) provided. Questions that have a correct answer in integer or decimal form are provided with one box. Questions that have a correct answer in the form of fractions have two boxes, one for the numerator and the other for the denominator.

1. Find the number of trailing zeroes in the numerical value of  $60!$
2. Find the number of ways in which 5 books can be arranged in 5 different rows.
3. Find the number of ways a student can choose 5 courses out of 9 courses, if 2 courses are mandatory.
4. If  $a, b, c, d, e,$  and  $f$  are distinct primes, how many factors does the product of  $a \times b \times c \times d \times e \times f$  have?
5. When three cards are selected from a deck of cards, what is the probability that all the selected cards are diamonds?
6. Two people select one number each from 1 to 25. What is the probability that both the numbers are different?
7. In a certain college, 50 percent of the students are freshers. Of these, 20 percent attend the school of liberal arts. Of these, 30 percent have taken psychology as a major. What percent of the students in the college are freshers attending the school of liberal arts with psychology as a major?
8. A large container is filled with orange, purple, maroon and silver balls worth 5, 3, 7, and 2 points respectively. A number of balls are removed from the container. If the product of the points of the balls that were removed is 75,600, then how many silver balls were removed?
9. A bag contains 31 blue, 24 red, 18 green, 29 white and 30 silver balls. If 25 balls of the same color need to be picked, how many balls should be selected from the bag?
10. How many 4-digit numbers are divisible by 5?

### Exercise No. 4

*Directions: Compare Column A with Column B, using additional information, if such information is given. Select from one of the following four answer choices.*

- A. Column A is greater.  
 B. Column B is greater.  
 C. The two columns are equal.  
 D. The relationship cannot be determined from the information given.

1. Set  $A = \{637, 481, 641, 334, 483, 242, 486\}$

**Column A**

**Column B**

Sum of all the numbers in the set that are divisible by 7

1120

2. If  $\sqrt{7} \times \sqrt{5} < x < \frac{6!}{3!}$

**Column A**

**Column B**

Number of even integers that satisfy the value of  $x$

Number of odd integers that satisfy the value of  $x$

3. Kevin's score in the first three exams is 85, 78 and 95 respectively. After he receives the score in the 4th exam, his average score for the four exams is 87.

**Column A**

**Column B**

Kevin's score in the 4th exam

86

4. At least one of the three positive consecutive integers is greater than 10, and their sum is less than 51.

**Column A**

**Column B**

The greatest possible median of the three integers

17

5. **Column A**  
 Number of trailing zeroes in  $\frac{50!}{4!}$

**Column B**  
 Number of trailing zeroes in  $\frac{60!}{5!}$

6. Set  $A$  has 11 numbers which are consecutive integers.

**Column A**

**Column B**

Standard deviation of elements in set  $A$

Standard deviation of the first 10 positive even Integers

7. A survey was conducted to determine the voter's sentiment on 5 participants contesting in the elections for a control board for a project.

**Column A**

**Column B**

Probability that 2 or more people out of the 5 will not favor the project

Probability that 4 or more people out of the 5 will favor the project

8. A dice is rolled and a coin is tossed

**Column A**

**Column B**

Total number of outcomes

8

9. Probability of team  $A$  winning any match is  $\frac{3}{5}$  and team  $B$  winning any match is  $\frac{3}{7}$ .

**Column A**

**Column B**

Probability that team  $A$  wins the match over Team  $B$

$\frac{3}{5}$

10. A bag contains only red, white, and blue balls. One-third of the balls are white and one-fifth of the balls are blue.

**Column A**

**Column B**

Probability of drawing two red balls

Probability of drawing one blue and one white ball

### Exercise No. 5

**Directions for Questions 1–5:** Select the correct option from the choices that follow the question.

- Set A consists of 29, 22, and 27. The mean of set A is 'S' and the median is 'R'. Which of the following must be true?  
 (A)  $S \leq R$       (C)  $S > R$       (E)  $S < R$   
 (B)  $S \geq R$       (D)  $S = R$
- In a class of 15 students, the number of ways in which the first, second, and third ranks can be given is  
 (A)  $15 \times 15 \times 15$       (D)  $\frac{15 \times 14 \times 13}{3!}$   
 (B) 12!  
 (C)  $15 \times 14 \times 13$       (E) 15!
- If 'N' is the mean of 5 numbers, which of the following must be true?  
 (I) At least one of the five numbers is greater than or equal to N.  
 (II) At least one of the five numbers is less than or equal to N.  
 (III) At least two of the five numbers is greater than or equal to N.  
 (A) I only      (D) I and III only  
 (B) II only      (E) I, II and III  
 (C) I and II only
- The median of the set of positive distinct integers  $\{v, w, x, y, z\}$  is 10. What is the least possible value of  $v + w + x + y + z$ ?  
 (A) 25    (B) 32    (C) 36    (D) 40    (E) 50
- In an examination, there are four multiple-choice questions with 3 options each, of which one option is the correct answer. In how many ways can a student answer, such that he/she fails to answer all the four questions correctly?  
 (A) 11    (B) 16    (C) 63    (D) 80    (E) 82

**Directions for Questions 6–10:** Compare Column A with Column B, using the additional information if given. Select one of the following four answer choices.

- Column A is greater.
  - Column B is greater.
  - The two columns are equal.
  - The relationship cannot be determined from the information given.
- A coin is tossed 14 times. Eight times it is heads and 6 times it is tails. The second and the thirteenth attempts are heads.  

<b>Column A</b>	<b>Column B</b>
The maximum number of heads that can occur in a row	8
  - A dice is rolled 3 times  

<b>Column A</b>	<b>Column B</b>
The number of outcomes in which the sum is even	150
  - A bag contains 6 blue marbles and 8 red marbles. Two marbles are selected at random, with the first selected marble being replaced in the bag before the second marble is drawn.  

<b>Column A</b>	<b>Column B</b>
Probability of drawing a blue marble followed by another blue marble	Probability of drawing a red marble followed by another red marble
  - $r < s < t$  and  $r, s,$  and  $t$  are positive numbers.  

<b>Column A</b>	<b>Column B</b>
Standard deviation of $r, s,$ and $t$	Median of $r, s,$ and $t$
  - $A = \{\text{Set of positive odd integers less than } 100\}$   
 $B = \{\text{Set of positive even integers less than } 5\}$   
 $C = \{\text{all possible elements } a \times b, a \in A \text{ \& } b \in B\}$   

<b>Column A</b>	<b>Column B</b>
Number of distinct integers in Set C	100

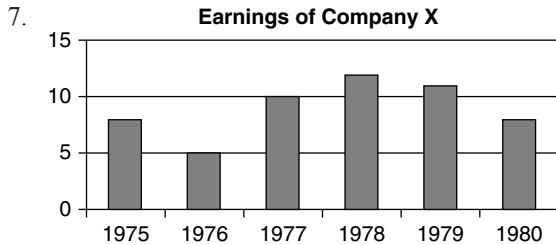
# CHAPTER 23

## Practice Test

### Section-1: Quantitative Reasoning

Directions for Questions 1 to 8: Select the correct option from the choices that follow.

- Which of the following is 950 percent greater than  $7 \times 10^3$ ?  
(A)  $6.5 \times 10^3$                       (D)  $7.35 \times 10^4$   
(B)  $5.6 \times 10^4$                       (E)  $8.56 \times 10^5$   
(C)  $6.6 \times 10^4$
- In a nationwide poll,  $N$  people were interviewed. If  $1/4$  of them answered 'yes' to question 1, and of those,  $1/3$  answered 'yes' to question 2, which of the following expressions represents the number of people interviewed who did not answer 'yes' to both questions?  
(A)  $N/7$                       (C)  $5N/12$                       (E)  $11N/12$   
(B)  $6N/7$                       (D)  $7N/12$
- In July, the price of a stock increased by 10 percent. In August, it declined by 20 percent. If in September, the price increased by 10 percent, then by what percentage of the original price in July has the stock's price changed, from the beginning of July to the end of September?  
(A) 0%    (B) 3.2%    (C) 4.4%    (D) 20%    (E) 40%
- If  $y = (x + 2)/(y - 3) = 0$ , then which of the following must be true?  
(A)  $x = 2$  and  $y = 3$                       (D)  $x = -2$  and  $y \neq 3$   
(B)  $x = 2$  and  $y \neq 3$                       (E) No solution  
(C)  $x = -2$  and  $y = 3$
- The vertices of a quadrilateral  $ABCD$  are  $A(1, 1)$ ,  $B(5, 6)$ ,  $C(10, 10)$  and  $D(6, 5)$ . What is the shape of the quadrilateral?  
(A) Square  
(B) Rectangle but not a square  
(C) Rhombus  
(D) Parallelogram but not a rhombus  
(E) None of these
- In a certain game, a large container is filled with red, yellow, green, and blue beads worth 7, 5, 3, and 2 points respectively. A certain number of beads are then removed from the container. If the product of the point values of the beads removed is 147,000, how many red beads were removed?  
(A) 5    (B) 4    (C) 3    (D) 2    (E) 0



If the earnings of a company are less than 10% of the sales in a year, it is estimated that the company would incur a heavy loss. How many times did the company X incur a heavy loss?

- (A) 0 (D) 3  
 (B) 1 (E) It cannot be determined  
 (C) 2

8. Runners X and Y started an 18-mile race at the same time. Runner X completed the course in 6 hours, while runner Y completed the course 2 hours early. Runner Y ran an average of how many miles per hour faster than runner X?  
 (A) 1 (B) 1.5 (C) 2.25 (D) 3 (E) 4.5

**Directions for Questions 9 to 15: Compare Column A with Column B, using additional information, if given and select from one of the following four answer choices.**

- A. Column A is greater.  
 B. Column B is greater.  
 C. The two columns are equal.  
 D. The relationship cannot be determined from the information given.

9.  $a$ ,  $b$ , and  $c$  are positive integers and  $ab = c$ .

Column A	Column B
$a$	$c$

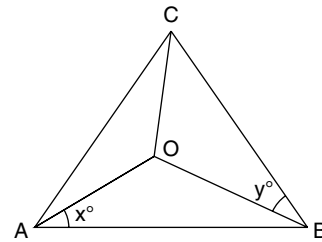
10. **Column A** **Column B**

$\sqrt{(x)} - \sqrt{(y)}$	$\sqrt{(x - y)}$
---------------------------	------------------

11.  $a > 1$  and  $b > 1$

Column A	Column B
$b^{(a + 1)}$	$b^a$

12. Segments  $OA$ ,  $OB$ , and  $OC$  are the angle bisectors of triangle  $ABC$  and  $\angle ABO = 33^\circ$ .



Column A	Column B
$x + y$	57

13. **Column A** **Column B**  
 $(10^{18} - 10^{16}) / 9$   $11(10^{16})$

14. A card is drawn from a deck of cards.

Column A	Column B
Probability of drawing a black-colored even-numbered card.	Probability of drawing an unnumbered card.

15. A regular pentagon has all sides and all interior angles equal. In a regular polygon, the length of each side is 5 inches.

Column A	Column B
Area of the regular polygon.	Area of 5 equilateral triangles each with a side of 5 inches.

**Directions for Questions 16 to 17: Select all the options that are correct as per the information given. Remember that one or more options may be correct.**

16. Which of the following regular polygons has an interior angle that is an integer? (Mark all correct answers).

- (A) Triangle  
 (B) Square  
 (C) Pentagon  
 (D) Heptagon  
 (E) Nonagon (Polygon with 9 sides)  
 (F) Decagon (Polygon with 10 sides)  
 (G) Endagon (Polygon with 11 sides)  
 (H) Tridecagon (Polygon with 13 sides)  
 (I) Quindecagon (Polygon with 15 sides)

17. A square is inscribed in another square leaving a strip of uniform width around the smaller square. If the ratio of the area of the inner square to the area of the strip is 25:39, what would be the integer value width of the strip? (Mark all correct answers).

- (A) 2      (C) 4      (E) 9      (G) 16  
 (B) 3      (D) 6      (F) 12

**Directions for Questions 18 to 20: Write your answer to the given questions in the box(es) provided. Questions that have a correct answer in the form of integer or decimal are provided with one box. Questions that have a correct answer in the form of fractions have two boxes, one for the numerator and the other for the denominator.**

18. In a certain college, 50% are first-year students and the rest are second-year students. 80% of the first-year students are boys. The number of girls in the second year is 3 times the number of girls in the first year. The number of boys in the second year is

what fraction of the total number of students in the college?


19. Tanks *A* and *B* are in the shape of a right circular cylinder. The interior of tank *A* has a height of 10 units and a circumference of 8 units, and the interior of tank *B* has a height of 8 units and a circumference of 10 units. The capacity of tank *A* is what percent of the capacity of tank *B*?

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20. In a certain game of 50 questions, the final score is calculated by subtracting twice the number of wrong answers from the total number of correct answers. If a player attempts all questions and receives a total score of 35, how many questions did they answer incorrectly?

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## Section-2: Quantitative Reasoning

**Directions for Questions 1 to 8: Select the correct option from the choices that follow the question.**

1.  $\sqrt{(x-1)} = x-7; x = ?$

- (A) -5 or 10      (D) 5 or 10  
 (B) 5 or -10      (E) None of these  
 (C) -5 or -10

2. Roy is now 4 years older than Eric and half as old as Iris. If in 2 years, Roy is twice as old as Eric, then what would be Roy's age multiplied by Iris's age?

- (A) 8    (B) 12    (C) 28    (D) 48    (E) 50

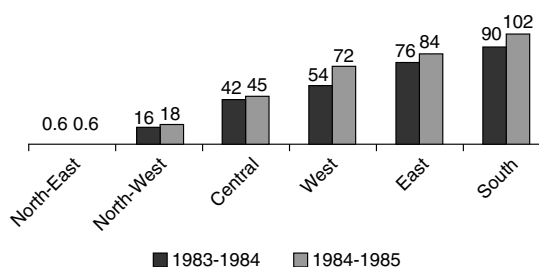
3. Which of the following is the difference between two numbers, both of which are divisible by 2, 3, and 4?

- (A) 71    (B) 72    (C) 73    (D) 74    (E) 75

4. The number of positive integers of  $n$  in the range  $12 \leq n \leq 40$ , such that the product  $(n-1)(m-2) \dots 3 \cdot 2 \cdot 1$  is not divisible by  $n$ , is

- (A) 5    (B) 7    (C) 13    (D) 14    (E) 18

5.



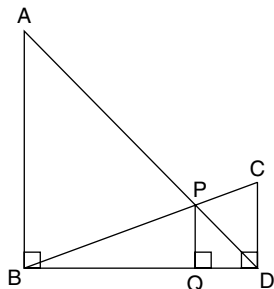
The total production of regions that show a growth of more than 10% in the given period form what proportion of the total production for all the regions for the year 1984–1985?

- (A) 82.1%      (C) 91.7%      (E) 95%  
 (B) 85.8%      (D) 93.6%

6. By what percent does the combined production in 1983–1984 of the two largest cotton producing regions exceed the production of the region whose production was closest to the average production of all the regions that year?

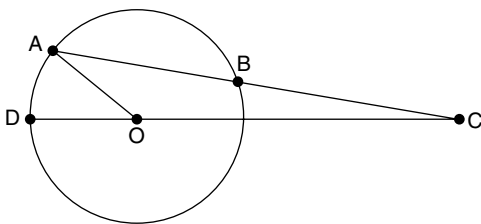
(A) 360%      (C) 160%      (E) 100%  
 (B) 255%      (D) 120%

7. In the diagram given below,  $\angle ABD = \angle CDB = \angle PQD = 90^\circ$ . If  $AB:CD = 3:1$ , the ratio of  $CD : PQ$  is



(A) 1: 0.69      (D) 1: 1  
 (B) 1: 0.75      (E) None of the above  
 (C) 1: 0.72

8. In the figure below,  $AB$  is the chord of the circle with center  $O$ .  $AB$  is extended to  $C$  such that  $BC = OB$ . A straight line  $CO$  is drawn to meet the circle at  $D$ . If  $\angle ACD = y^\circ$  and  $\angle AOD = x^\circ$  such that  $x = ky$ , then, the value of  $k$  is



(A) 3      (D) 0  
 (B) 2      (E) None of the above  
 (C) 1

*Directions for Questions 9 to 15: Compare Column A with Column B, using additional information if given and select from one of the following four answer choices.*

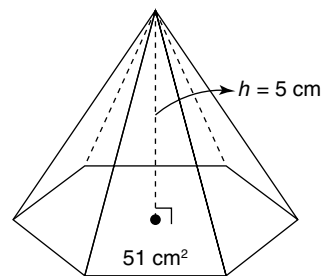
- A. *Column A is greater.*  
 B. *Column B is greater.*  
 C. *The two columns are equal.*  
 D. *The relationship cannot be determined from the information given.*

9. Tim and Tom divided cookies between themselves. Tim took 30% of the cookies and Tom took 40% of the cookies. Tim ate  $\frac{1}{3}$ rd of the cookies he took and Tom ate  $\frac{1}{4}$ th of the cookies he took.

Column A	Column B
Number of cookies Tim ate.	Number of cookies Tom ate.

10. If the slope of the line ( $k$ ) is 1,  
 Column A      Column B  
 $y$ -intercept of the line ( $k$ ).       $x$ -intercept of the line ( $k$ ).

11.



Column A	Column B
The volume of the pyramid in the diagram if the height is increased to 6 cm.	The volume of a regular pyramid with area of the base = $60 \text{ cm}^2$ and height = 5 cm.

12. A bill was shared among 8 students. When 4 more students decided to share the bill, the cost per head was reduced by \$2.

Column A	Column B
The amount of the bill.	\$50.

13. On the number line, the number  $x$  is such that the distance from 12 is one unit more than twice the distance from 6.

**Column A**

10

**Column B** $x$ 

14.  $0 < -p < 5$ ;  $6 < -q < 10$

**Column A** $p + q$ **Column B**

6

15. The rate of a chemical reaction triples with every  $10^\circ$  rise in temperature.

**Column A**Half the rate at  $40^\circ$  temperature.**Column B**Double the rate at  $30^\circ$  temperature.

**Directions for Questions 16 to 17: Select all the options that are correct as per the information given. Remember that one or more options may be correct.**

16. The two long sides of a triangle are 8 and 12 units. Which of the following could be the area of the triangle? (Mark all correct answers).

(A) 48      (C) 32      (E) 10      (G) 1  
 (B) 36      (D) 12      (F) 5      (H) 0.1

17. A company has more female employees than male employees. The probability of selecting 3 women from all 10 employees is less than 60%. How many

women employees are there in the company? (Mark all the correct answers).

(A) 10   (B) 9   (C) 8   (D) 7   (E) 6   (F) 5

**Directions for Questions 18 to 20 : Write your answer to the given questions in the box(es) provided. Questions that have a correct answer in the form of integer or decimal are provided with one box. Questions that have a correct answer in the form of fractions have two boxes, one for the numerator and the other for the denominator.**

18. For how many two-digit positive numbers tripling the tens digit will give a two-digit number that is three times the original number?

19. What is the maximum volume of the cylinder that can be placed in a cubical box of dimensions  $6 \times 8 \times 10$ ?

20. Let  $A$  and  $B$  be two solid spheres such that the surface area of  $B$  is 300% higher than the surface area of  $A$ . The volume of  $A$  is found to be  $k\%$  lower than the volume of  $B$ . The value of ' $k$ ' must be

### Practice Test Two: Section-1

**Directions for Questions 1 to 9: Select the correct option from the choices that follow.**

1. Three years ago, a father was 24 years older than his son. At present, the father is 5 times as old as his son. How old will the son be three years from now?  
 (A) 27 years      (C) 9 years      (E) 3 years  
 (B) 12 years      (D) 6 years

2. For what range values of ' $x$ ' will the inequality  $15x - \frac{2}{x} > 1$  hold true?  
 (A)  $x > 0.4$   
 (B)  $x < \frac{1}{3}$

(C)  $-\frac{1}{3} < x < 0.4, x > \frac{1}{5}$

(D)  $-\frac{1}{3} < x < 0, x > \frac{2}{5}$

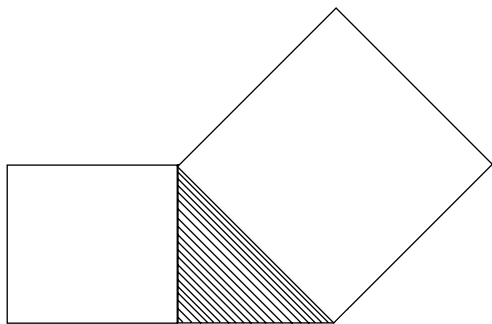
(E)  $x < -\frac{1}{3}$  and  $x > \frac{2}{5}$

3. A car wheel of radius 21 cms is rotating at 600 RPM. What is the speed of the car in miles/hr? (1 mile = 1500 meters)

(A) 79.2 miles/hr      (D) 7.92 miles/hr  
 (B) 47.52 miles/hr      (E) 3.96 miles/hr  
 (C) 39.6 miles/hr



4.



In the figure above, the two square regions have areas 144 sq. units and 25 sq. units, respectively. What is the approximate area of the shaded triangular region?

- (A)  $2\sqrt{10}$       (C) 27      (E) 50  
 (B)  $5\sqrt{10}$       (D) 30
5. If the ratio of the sum of the first 6 terms of a geometric progression (G.P.) to the sum of the first 3 terms of the G.P. is 9, what is the common ratio of the G.P.?  
 (A)  $1/3$     (B)  $1/9$     (C) 2    (D) 3    (E) 9
6. The arithmetic mean of 5 consecutive integers starting with 's' is 'a'. What is the arithmetic mean of 9 consecutive integers that start with  $s + 2$ ?  
 (A)  $2 + s + a$     (C)  $2s$       (E)  $4 + a$   
 (B)  $2 + a$       (D)  $2a + 2$
7. The average age of a group of 10 students was 20. The average age increased by 2 years when two new students joined the group. What is the average age of the two new students who joined the group?  
 (A) 22 years      (D) 44 years  
 (B) 30 years      (E) None of these  
 (C) 32 years
8. Ten coins are tossed simultaneously. In how many of the outcomes will the third coin turn up a head?  
 (A)  $2^{10}$       (C)  $3 * 2^8$     (E) None of these  
 (B)  $2^9$       (D)  $3 * 2^9$

9. In a class, 40% of the students enrolled for Math and 70% enrolled for Economics. If 15% of the students enrolled for both Math and Economics, what % of the students of the class did not enroll for either of the two subjects?

(A) 0%      (C) 15%      (E) None of these  
 (B) 5%      (D) 25%

*Directions for Questions 10 to 17: Compare Column A with Column B, using additional information, if given and select from one of the following four answer choices.*

- A. Column A is greater.  
 B. Column B is greater.  
 C. The two columns are equal.  
 D. The relationship cannot be determined from the information given.

10.  $\{x, y\}$  represents the remainder when  $x$  is divided by  $y$ .

Column A	Column B
$\{5^6, 10\}$	$\{10^4, 5\}$

11. To mail an envelope first class costs \$0.34 for the first ounce, plus \$0.17 for each additional ounce. The cost to mail an envelope was \$1.53.

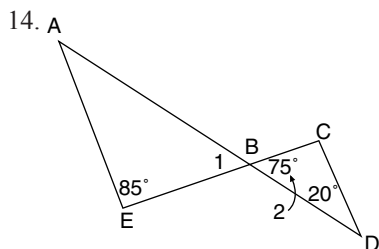
Column A	Column B
8 ounces	Weight of the envelope

12. Let  $d$  = number of dimes.  
 Let  $p$  = number of pennies.

Column A	Column B
$0.10d + 0.01p$	$10d + p$

13. The circumference of circle  $O$  is 30 cm. The length of arc ABC is 3 cm.

Column A	Column B
$35^\circ$	The measure of $\angle x$

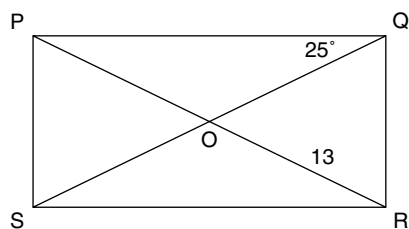
**Column A**

The ratio of  
the length of line segment AB  
the length of line segment DB

To the ratio of  
the length of line segment AE  
the length of line segment DC

**Column B**

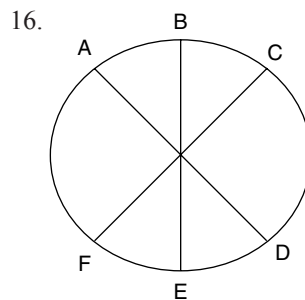
$$\frac{3}{4}$$

15. **Column A**

The length of line segment PR

**Column B**

Three times the length of line segment SO

**Column A**

Length of AB

**Column B**

Length of ED

17. The volume of a cube is 1 cubic centimeter.

**Column A**

Distance from any vertex to the center inside the cube

**Column B**

0.5 cm

**Directions for Questions 18 to 20: Select the correct option from the choices that follow the question**

18. The number of two digit even numbers that can be formed from 2, 3, 4, 5, 6, and 7 if each number can be used only once is

- (A) 10 (B) 15 (C) 25 (D) 100 (E) 125

19. In an examination there are four multiple choice questions, each with 3 options out of which one is correct. In how many ways can a student answer such that he fails to answer all the four questions correctly?

- (A) 11 (B) 16 (C) 63 (D) 80 (E) 82

20. Find the number of ways a student can choose 5 courses out of 9 courses, in which 2 of them are compulsory?

- (A) 25 (B) 35 (C) 45 (D) 47 (E) 95

### Practice Test Two: Section-2

**Directions for Questions 1 to 4: Select the correct option from the choices that follow the question.**

1. If  $4r + 3s = 7$ ,  $2r + s = 1$ , and  $2r + 2s = t - 4$ , then what is the value of  $t - 1$ ?

- (A) 6  
(B) 9  
(C) 10  
(D) 12  
(E) It cannot be determined from the information given

2. A certain university will select 1 of 7 candidates eligible to fill a position in the mathematics department and 2 of 10 candidates eligible to fill 2 identical positions in the computer science department. If none of the candidates is eligible for a position in both departments, how many different sets of 3 candidates are there to fill the 3 positions?

- (A) 42 (B) 70 (C) 140 (D) 165 (E) 315

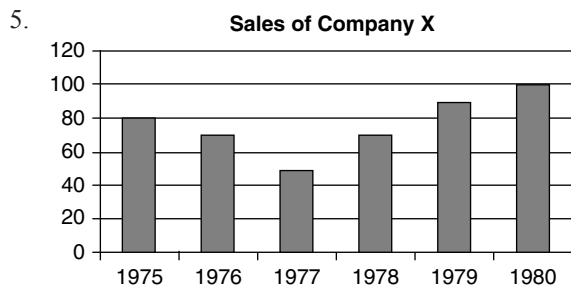
3. In a certain game, a large container is filled with red, yellow, green, and blue beads worth respectively 7, 5, 3, and 2 points each. A number of beads are then removed from the container. If the product of the point values of the removed beads is 147,000, how many red beads were removed?  
(A) 5 (B) 4 (C) 3 (D) 2 (E) 0
4. A certain river has a current of 3 miles per hour. A boat takes twice as long to travel upstream between two points as it does to travel downstream between the same two points. What is the speed of the boat in still water?  
(A) 3 miles per hour  
(B) 6 miles per hour  
(C) 9 miles per hour  
(D) 12 miles per hour  
(E) The speed cannot be determined from the given information
7. If the earnings of the company are less than 10% of the sales in a year, it is estimated that the company would incur heavy loss. How many times did the company X incur heavy loss?  
(A) 0 (D) 3  
(B) 1 (E) It cannot be determined  
(C) 2

**Directions for Questions 8 to 11: Select the correct option from the choices that follow the question**

8. If Jim walks at a speed of 3 miles an hour, he is 20 minutes early to the office. If he walks at 2 miles per hour, he is late by 30 minutes. What should be his speed (in miles per hour), so that he reaches office on time?  
(A) 3.5 (B) 3 (C) 2.5 (D) 2.25 (E) 2
9. A police vehicle is chasing another vehicle moving at a speed of 60 kmph. If the distance between them is 200 m, then what should be the police vehicle's minimum speed (in kmph) in order to overtake the other vehicle within a distance of 1 km?  
(A) 60 (B) 66 (C) 70 (D) 76 (E) 84

**Directions: Q. No. 5 to 7 are based on the data given below**

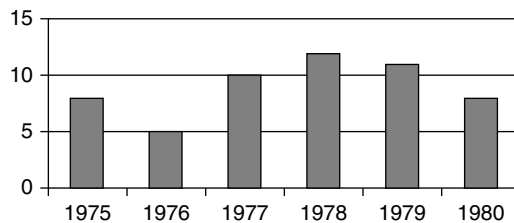
**Sales in thousand**



In which year is the percentage increase in the sales from the previous year the maximum?

- (A) 1976 (C) 1978 (E) 1980  
(B) 1977 (D) 1979
6. What is the average earning of the company X for the last four years?  
(A) 8.75 (C) 10.25 (E) 80  
(B) 9.2 (D) 77.5
10. The average score of boys in a class of 40 is 86 and the class average is 80. If the boys and girls are in the ratio of 5:3, what is the average score of the girls?  
(A) 65 (B) 70 (C) 75 (D) 80 (E) 85
11. The average of the numbers  $2x$ ,  $7x$ , and  $x^2$  is 12, where  $x < 0$ . Find the range of the numbers.  
(A) 208 (B) 218 (C) 228 (D) 238 (E) 248

**Earnings of Company X**



**Directions for Questions 12 to 14: Compare Column A with Column B, using additional information if given and select from one of the following four answer choices.**

- A. Column A is greater.  
 B. Column B is greater.  
 C. The two columns are equal.  
 D. The relationship cannot be determined from the information given.

12. **Column A**                      **Column B**  
 $7^{37} - 7^{36}$                        $6(7^{36})$

13. **Column A**                      **Column B**  
 $108^{97}$                                $108^{97} - 107^{97}$

14. An inlet can fill a tank in 6 hours. Another can empty it in 12 hours, if both are operated simultaneously, then

**Column A**                      **Column B**  
 Time taken for filling the tank up to half      8 hours

**Directions for Questions 15 to 16: Select all the options that are correct as per the information given. Remember that one or more options may be correct.**

15. Which of the following could be the remainder when  $3^{3n+3} + 3$  is divided by 5?  
 (A) 0      (C) 2      (E) 4      (G) -1  
 (B) 1      (D) 3      (F) 5

16.  $P = \{a, b, c, -5, -10\}$   $Q = \{a, b, c, 5, 10\}$ . The arithmetic mean of  $P$  is defined as  $S$  and the arithmetic mean of  $Q$  is defined as  $R$ . Then what is the value of  $S - R$ ?

- (A) -6    (B) -3    (C) 0    (D) 3    (E) 6

**Directions for Questions 17 to 20: Select the correct option from the choices that follow the question.**

17. The average of six numbers is 24. If the sum of four of these numbers is 96, then what is the average of the other two numbers?

- (A) 21    (B) 22    (C) 23    (D) 24    (E) 25

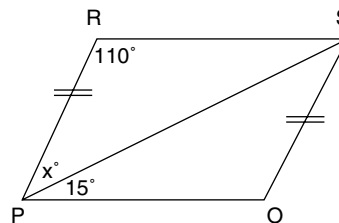
18. If  $p = t = 5h$ , then what is the average of  $p$ ,  $t$ , and  $5h$ ?

- (A)  $h$     (B)  $2h$     (C)  $3h$     (D)  $4h$     (E)  $5h$

19. If the average of 5, 9,  $k$ , and  $n$  is 12, then what is the average of  $k + 7$  and  $n - 3$ ?

- (A) 14    (B) 17    (C) 19    (D) 21    (E) 38

20. In the figure, if  $PQ \parallel RS$  then  $x = ?$



- (A) 95    (B) 85    (C) 75    (D) 65    (E) 55

# CHAPTER 24

## Answer Key

### *Arithmetic — Chapter 17*

Ex: 1	Key	Ex: 2	Key	Ex: 3	Key	Ex: 4	Key	Ex: 5	Key
1	B, C, E	1	B, D, E	1	13/36	1	B	1	D
2	A, D, E	2	A	2	7	2	B	2	C, E
3	C, E, F, G	3	B	3	5149	3	A	3	E
4	A, D, E, G	4	B	4	4	4	A	4	C
5	B, F, G	5	D	5	36	5	D	5	D
6	B, C, D, E	6	D	6	2550	6	C	6	A
7	B, D, G	7	B	7	30	7	D	7	D
8	A, D, F	8	E	8	17	8	B	8	C
9	A, B, C, D, E	9	E	9	8	9	B	9	B
10	B, C, G	10	D	10	600	10	B	10	B

### *Word Problems (Algebra) — Chapter 19*

Ex: 1	Key	Ex: 2	Key	Ex: 3	Key	Ex: 4	Key	Ex: 5	Key
1	B, C, D, E	1	E	1	7	1	B	1	D
2	B, F	2	C	2	0.8	2	B	2	A
3	D, E	3	C	3	10	3	A	3	C
4	A, C, E	4	B	4	614	4	C	4	B
5	B, F	5	B	5	-1.2	5	C	5	D
6	A, F	6	B	6	11080	6	D	6	D
7	B, C, E	7	B	7	15	7	A	7	D
8	C	8	C	8	1.53	8	A	8	C
9	B, C, D	9	B	9	1.5	9	D	9	B
10	D	10	C	10	1.75	10	B	10	D

**Geometry — Chapter 20**

Ex: 1	Key	Ex: 2	Key	Ex: 3	Key	Ex: 4	Key	Ex: 5	Key
1	A, B, C, D	1	C	1	10	1	C	1	B
2	B, C, D	2	B	2	40	2	B	2	D
3	B	3	D	3	3	3	B	3	A
4	C	4	D	4	156	4	B	4	C
5	D	5	C	5	216	5	A	5	E
6	D	6	D	6	3/10	6	B	6	A
7	B	7	A	7	5	7	C	7	C
8	C, E	8	B	8	200	8	A	8	D
9	D	9	C	9	7½	9	A	9	B
10	B	10	C	10	50	10	B	10	D

**Coordinate Geometry — Chapter 21**

Ex: 1	Key	Ex: 2	Key	Ex: 3	Key	Ex: 4	Key	Ex: 5	Key
1	C	1	D	1	7	1	A	1	D
2	A, D, F	2	A	2	20	2	B	2	C
3	B, C, E	3	C	3	5	3	A	3	B
4	C	4	C	4	45	4	B	4	C
5	A, B, C	5	A	5	3	5	A	5	B
6	A, B, C, D, E	6	B	6	3	6	A	6	B
7	B, E	7	D	7	-4/3	7	B	7	A
8	B	8	C	8	3	8	A	8	D
9	B, C, D, E	9	A	9	8	9	C	9	B
10	A	10	C	10	-8	10	C	10	B

**Data Analysis (Data Interpretation) — Chapter 22**

Ex: 1	Key	Ex: 2	Key	Ex: 3	Key	Ex: 4	Key	Ex: 5	Key
1	D	1	C	1	B	1	D	1	D
2	70.7	2	445	2	D	2	A	2	B
3	87.5	3	D	3	E	3	C	3	A
4	85.8	4	B	4	E	4	E	4	D
5	5	5	6890	5	E	5	A	5	D
6	C	6	E	6	E	6	B	6	B
7	14	7	A	7	C	7	C	7	C
8	A	8	B	8	E	8	D	8	E
9	C	9	A	9	C	9	C	9	A
10	D	10	I, II	10	A	10	D	10	B

**Counting Methods**

Ex: 1	Key	Ex: 2	Key	Ex: 3	Key	Ex: 4	Key	Ex: 5	Key
1	A, B, C	1	C	1	14	1	C	1	E
2	D	2	D	2	120	2	C	2	C
3	B, C	3	E	3	35	3	A	3	C
4	A, B, C	4	D	4	64	4	D	4	C
5	A, B	5	D	5	11/850	5	B	5	D
6	B, D, E	6	E	6	0.96	6	B	6	B
7	A, C	7	E	7	3%	7	A	7	B
8	B, C	8	B	8	4	8	A	8	B
9	A, B	9	C	9	115	9	B	9	D
10	E	10	B	10	1800	10	A	10	C

**Practice Test One — Chapter 23****Section - 1**

1	D	6	B	11	A	16	A, B, C, E, F, I
2	E	7	D	12	D	17	B, D, E, F
3	B	8	B	13	C	18	1/5
4	D	9	D	14	B	19	80 %
5	D	10	B	15	C	20	5

**Section - 2**

1	D	6	B	11	A	16	B, C, D, E
2	B	7	B	12	B	17	D, E, F
3	B	8	A	13	A	18	3
4	B	9	C	14	B	19	96
5	B	10	C	15	B	20	87.5

**Practice Test Two****Section - 1**

1	C	6	E	11	C	16	D
2	E	7	C	12	B	17	A
3	B	8	E	13	B	18	B
4	C	9	B	14	A	19	B
5	C	10	A	15	D	20	B

**Section – 2**

1	B	6	C	11	C	16	A
2	E	7	C	12	C	17	D
3	C	8	B	13	B	18	E
4	D	9	D	14	B	19	C
5	C	10	B	15	A, B, C	20	E