

CAT 2017 QA Slot 2 Answer Key

QNo:- 67 ,Correct Answer:- 3

Explanation:- The square grid is filled by 9 numbers from 1 to 9. Their sum $(1 + 2 + 3 + \dots + 9)$ equals 45. Since the sum of numbers in each row and each column and each diagonal must be equal, the sum of terms in each row and in each column and in each diagonal, must be 15. For this to happen, the middle element in the 2nd row and the 2nd column must be the middle-most term of the 9 terms, i.e. 5. The corner elements in the first row are 6 and 2 (given), so the middle element in the first row must be 7. In the 2nd column, the top most element is 7 and the middle element is 5, so the bottom row middle element must be 3.

QNo:- 68 ,Correct Answer:- 1900

Explanation:- A beats B by 1 km, means A travels 10 km in the same time that B travels 9 km. The ratio of speeds of A and B is 10 : 9. Similarly, the ratio of speeds of B and C is 10 : 9.

$$A : B = 10 : 9$$

$$B : C = 10 : 9$$

⇒ The ratio of speeds of A : B : C = 100 : 90 : 81

In the same time that A travels 100 m, C travels 81 metres

⇒ In the same time that A travels 10000 m, C would travel 8100 m or A would beat C by 1900 m. Ans: (1900)

QNo:- 69 ,Correct Answer:- B

Explanation:- Concentration of milk in the first bottle is $\frac{7}{9}$ and that in the second bottle is $\frac{9}{13}$. They need to be mixed in a certain ratio to get a solution which has $\frac{3}{4}$ th milk.

Applying alligation,

(Liquid taken from bottle 1)/(Liquid taken from bottle 2) =

$$\text{bottle 2) } = \frac{\frac{9}{13} - \frac{3}{4}}{\frac{3}{4} - \frac{7}{9}} = \frac{27}{13}$$

QNo:- 70 ,Correct Answer:- C

Explanation:- Let the distance from his home to his hostel be x miles.

Time taken on his onward journey = $x/60$ hours

Time taken on his return journey = $(x/2)/25 + (x/2 + 5)/50$

Given, his return journey took 0.5 hours more than his onward journey

$$\Rightarrow x/60 + 0.5 = x/50 + (x/2 + 5)/50$$

Upon solving, $x = 30$

Therefore, total distance travelled = $30 + 15 + 20 = 65$ miles.

QNo:- 71 ,Correct Answer:- B

Explanation:- A total of 15% shirts are defective. Of the remaining 85%, 20% are sold in the domestic market. So, 20% of 85%, i.e. 17% are sold in the domestic market and the remaining 68% are exported. But, it is given that 8840 shirts were exported.

$$\text{If 68\% is 8840, 100\%} = \frac{(100)(8840)}{68} = 13000.$$

QNo:- 72 ,Correct Answer:- C

Explanation:- Let the average height of the 20 toddlers be x inches. When the 2 toddlers are included, the average of the group comes down by 2, i.e. it becomes $x - 2$. Also, given, that the average height of the 2 toddlers is one-third of the average height of the 22 toddlers, viz. $x - 2$.

$$\frac{20(x) + \frac{2(x-2)}{3}}{22} = x - 2$$

Upon solving, $x = 32$ inches.

QNo:- 73 ,Correct Answer:- B

Explanation:- Let the manufacturing cost of the table be Rs. m .
The wholesaler buys it for Rs. $1.1m$.
The retailer buys it for Rs. $(1.1)(1.3)m$.
The customer buys it for Rs. $(1.1)(1.3)(1.5)m$, viz. Rs. $2.145m$.
Given, $2.145m = 4,290$
 $\Rightarrow m = \text{Rs.}2,000$

QNo:- 74 ,Correct Answer:- A

Explanation:- The inlet pipe can normally fill the tank in 8 hours, but it takes 10 hours when the outlet pipe is also open. In the two additional hours, the inlet pipe fills $2/8$ or 25% more, and the outlet pipe took 10 hours to drain the additional 25%. So, the outlet pipe can drain 25% in 10 hours, and to drain 50%, it'll take 20 hours.
Alternatively, we can assume total capacity of the tank as LCM [8, 10] or 40 litres. We'll know the filling rates and the emptying rates of both the pipes and we can answer the question based on the same.

QNo:- 75 ,Correct Answer:- A

Explanation:- He buys x dozen candies at Rs. 15 a dozen and x more dozen at Rs. 12 a dozen, so the average cost per dozen is Rs. $(15 + 12)/2 = \text{Rs.}13.5$ a dozen.
By selling a dozen at Rs. 16.5, he'll make a profit of Rs. 3 per dozen.
To make an overall profit of Rs. 150, he needs to sell 50 dozen.

QNo:- 76 ,Correct Answer:- C

Explanation:- Let the initial production be p , population be x and the initial per capita consumption be c .

As $p = (c)(x)$, we can say-

$$\frac{(x_1)(c_1)}{p_1} = \frac{(x_2)(c_2)}{p_2}$$

Finally, production became $1.4p$ and per capita consumption became $1.27c$.

$$\frac{(x)(c)}{p} = \frac{(x_2)(1.27c)}{1.4p} \Rightarrow x_2 = \frac{(1.4x)}{1.27} = 1.102x$$

Therefore, population (x) increased by approximately 10%.

QNo:- 77 ,Correct Answer:- C

Explanation:- $a : b = 3 : 4$ and $b : c = 2 : 1$

Multiplying the second ratio by 2, we have

$$a : b = 3 : 4$$

$$b : c = 4 : 2$$

Therefore, $a : b : c = 3 : 4 : 2$.

$$\Rightarrow a = 3k, b = 4k, c = 2k.$$

Since a , b and c are positive integers, their sum should be $9k$, a positive integer.

From the options, only choice (3), which is 207, is a multiple of 9.

QNo:- 78 ,Correct Answer:- B

Explanation:- The motorbike that left A travelled 168 km from 1:00 p.m. to 3:40 p.m., i.e. in $2 \frac{2}{3}$ hours or $8/3$ hours.

The car that left B, started at 2:00 p.m. and travelled till 3:40 p.m., i.e. for $1 \frac{2}{3}$ hours or $5/3$ hours.

The car would've travelled $5/8$ th of the distance as the bike, but since the car travelled at twice the speed, the car would've travelled $10/8$ th of the distance, i.e. $(10/8) \times 168 = 210$ km.

Therefore, total distance between A and B = $168 + 210 = 378$ km.

QNo:- 79 ,Correct Answer:- A

Explanation:- The team completes the job in 4 days.

Since Amol needs 10 days to complete the job, in 4 days, he does $\frac{4}{10}$ th or 40% of the work.

Since Bimal needs 8 days to complete the job, in 4 days, he does $\frac{4}{8}$ th or 50% of the work.

Therefore, Kamal did 10% of the work and for doing 10% of the work, he gets 10% of the payment, i.e. Rs. 100.

QNo:- 80 ,Correct Answer:- C

Explanation:- First mixture has $\frac{2}{3}$ ths A and the rest water. Second mixture has $\frac{3}{4}$ ths B and the rest water. Third mixture has $\frac{4}{5}$ ths C and the rest water.

The 3 mixtures are mixed in the ratio 4 : 3 : 2. Let's say we get a 1 litre mixture containing the three mixtures.

There will be $\frac{4}{9}(\frac{2}{3})$ th A, $\frac{3}{9}(\frac{3}{4})$ th B and $\frac{2}{3}(\frac{4}{5})$ th C.

C. (the remaining part would be water)

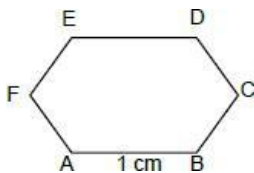
$\frac{8}{27}$ litres A, $\frac{9}{36}$ litres B, $\frac{8}{45}$ litres C

$$\text{Water} = 1 - \left[\frac{8}{27} + \frac{9}{36} + \frac{8}{45} \right] = \frac{149}{540} \text{ litres}$$

$$\text{We can see that } \frac{149}{540} < \frac{8}{27} \text{ and } \frac{149}{540} > \frac{9}{36}$$

\therefore There is more water than B in the resultant solution. Choice (3)

QNo:- 81 ,Correct Answer:- B



Explanation:-

In $\triangle ABC$, $AB = 1 \text{ cm}$, $BC = 1 \text{ cm}$

As $\angle B = 120^\circ$,

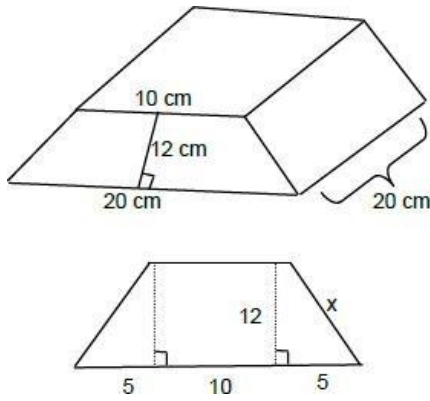
$$AC^2 = 1^2 + 1^2 - 2(1)(1) \cos(120^\circ) \text{ (Cosine rule)}$$

$$= 1^2 + 1^2 + 1 = 3$$

$$\Rightarrow AC = \sqrt{3} \text{ cm}$$

The square of side $\sqrt{3} \text{ cm}$ will have an area of $(\sqrt{3})^2 = 3 \text{ cm}^2$

QNo:- 82 ,Correct Answer:- C



Explanation:-

Given, the non-parallel sides are equal.

Let the non-parallel sides be x cm each

$$x = \sqrt{12^2 + 5^2} = 13$$

So, we have 6 faces, two are trapezoid faces and 4 are rectangular faces.

Area of 2 trapeziums

$$= 2 \left[\frac{1}{2} (12)(10+20) \right] = 360 \text{ cm}^2$$

Area of 4 rectangles

$$= 2[13 \times 20] + 20(20) + 10(20) = 1120 \text{ cm}^2$$

$$\text{Total area} = 1120 + 360 = 1480 \text{ cm}^2 \text{ Choice (3)}$$

QNo:- 83 ,Correct Answer:- D

Explanation:- In a rectangle, diagonals bisect each other, so one diagonal should pass through the midpoint of the other.

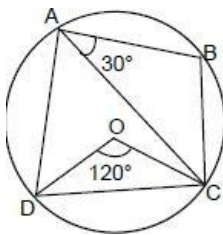
Midpoint of the diagonal connecting (2, 5) and (6, 3)

$$= \left(\frac{2+6}{2}, \frac{5+3}{2} \right) = (4, 4)$$

The other diagonal, $y = 3x + c$ should also pass through (4, 4).

$$\text{On substitution, } 4 = 3(4) + c \Rightarrow c = -8.$$

QNo:- 84 ,Correct Answer:- 90



Explanation:-

Given, $\angle COD = 120^\circ$ and $\angle BAC = 30^\circ$.

As $\angle COD = 120^\circ$, $\angle DAC = 60^\circ$ (Central angle)

$$\angle DAC + \angle BAC = 60^\circ + 30^\circ = 90^\circ$$

$\angle A = 90^\circ \Rightarrow \angle BCD = 90^\circ$ (Opposite angles are supplementary in a cyclic quadrilateral)

QNo:- 85 ,Correct Answer:- 200

Explanation:- Let one side be l and the other be b . (l is not necessarily greater than b)

Given, $2l + b = 400$

For area to be maximum, lb should be maximum.

$\therefore l(400 - 2l)$ should be maximum

$l(400 - 2l) = l(2)(200 - l) = 2(l)(200 - l)$

$l(200 - l)$ will be maximum when $l = 200 - l$ or $2l = 200$

$\Rightarrow l = 100$

If $l = 100$, $b = 200$.

\therefore The longer side must be 200 feet long.

QNo:- 86 ,Correct Answer:- 16

Explanation:- As P is equidistant from the sides, P is the in center of the triangle.

r is the in radius of the triangle, viz. $4(\sqrt{2} - 1)$ cm

Let the sides of the triangle be a , a , $a\sqrt{2}$

As $\Delta = \frac{1}{2}(a)(a) = r(s)$,

$$\frac{a^2}{2} = 4(\sqrt{2} - 1) \frac{(a+a+a\sqrt{2})}{2}$$

$\Rightarrow a = 4\sqrt{2}$

Area = $\frac{1}{2}(a^2) = 16$ sq. units

QNo:- 87 ,Correct Answer:- D

Explanation:- Given, $(n - 1)(n)(n + 1) = 15600$

As 15600 has 2 zeroes in it, one of $n - 1$, n or $n + 1$ should be a multiple of 25.

Dividing 15600 by 25, we get 624, but $624 = 24 \cdot 26$ so, the numbers are 24, 25 and 26

$24^2 + 25^2 + 26^2 = 1877$

QNo:- 88 ,Correct Answer:- D

Explanation:- $\log_3 5 = \log_5 (x + 2)$

$\log_3 3 < \log_3 5 < \log_3 9$

$1 < \log_3 5 < 2$

So, $1 < \log_5 (x + 2) < 2$

$5^1 < x + 2 < 5^2$

$3 < x < 23$

QNo:- 89 ,Correct Answer:- C

Explanation:- $f[f(2^x) + g(x^2)]$

as $x = 1$,

$f[f(2) + g(1)]$

$= f[2^2 + 2^1]$

$= f[6] = 6^2 = 36$

QNo:- 90 ,Correct Answer:- C

Explanation:- $x^2 + (a + 3)x - (a+5) = 0$

$$\alpha^2 + \beta^2 = (\alpha + \beta)^2 - 2\alpha\beta = (-(a + 3))^2 - 2(-(a + 5))$$

$$= a^2 + 9 + 6a + 2(a + 5)$$

$$= a^2 + 8a + 19$$

$$= (a + 4)^2 + 3$$

The minimum value is 3, at $a = -4$. Choice (3)

QNo:- 91 ,Correct Answer:- A

$$9^{x-\frac{1}{2}} - 2^{2x-2} = 4^x - 3^{2x-3}$$

$$\frac{9^x}{9^{1/2}} - \frac{2^{2x}}{4} = 4^x - \frac{3^{2x}}{27}$$

$$\frac{9^x}{3} - \frac{2^{2x}}{4} = 4^x - \frac{9^x}{27}$$

$$\frac{9^x}{3} - \frac{4^x}{4} = 4^x - \frac{9^x}{27}$$

$$\frac{9^x}{3} + \frac{9^x}{27} = 4^x + \frac{4^x}{4}$$

$$9^x \left(\frac{10}{27}\right) = 4^x \left(\frac{5}{4}\right)$$

Explanation:-

$$\frac{9^x}{4^x} = \frac{27}{8}$$

$$\left(\frac{3}{2}\right)^{2x} = \frac{27}{8} = \frac{3^3}{2^3} = \left(\frac{3}{2}\right)^3$$

$$2x = 3 \Rightarrow x = \frac{3}{2}$$

Alternately, we could've substituted the value of x from the options and it would've taken much less time.

QNo:- 92 ,Correct Answer:- 3

$$\log(2^a \times 3^b \times 5^c) = \frac{1}{3} [\log(2^2 \times 3^3 \times 5) +$$

$$\log(2^6 \times 3 \times 5^7) + \log(2 \times 3^2 \times 5^4)]$$

$$\log(2^a 3^b 5^c) = \frac{1}{3} [\log(2^2 \times 3^3 \times 5 \times 2^6 \times 3 \times 5^7$$

$$\times 2 \times 3^2 \times 5^4)]$$

$$\log(2^a 3^b 5^c) = \frac{1}{3} [\log(2^9 \times 3^6 \times 5^{12})]$$

Explanation:- $\log(2^a 3^b 5^c) = \log(2^3 \times 3^2 \times 5^4)$

While it is not explicitly stated that a, b and c are integers, going by the spirit of the question, we are forced to assume that they are integers. In that case, we can equate the powers of 2, 3 and 5 on the LHS and the RHS and say that $a = 3, b = 2$, and $c = 4$.

QNo:- 93 ,Correct Answer:- 51

Explanation:- The 5 consecutive odd numbers are $a_1, a_2,$

a_3, a_4, a_5

The 5 consecutive even numbers are

$2a_3 - 8, 2a_3 - 6, 2a_3 - 4, 2a_3 - 2, 2a_3$

The sum of these 5 numbers = $10a_3 - 20 = 450$ (given)

$\therefore a_3 = 47$ and $a_5 = 51$. Ans: (51)

QNo:- 94 ,Correct Answer:- 3

Explanation:- $\frac{1}{a} + \frac{1}{b} = \frac{1}{9}$

$$\Rightarrow 9(a + b) = ab$$

$$\Rightarrow ab - 9a - 9b + 81 = 81$$

$$\Rightarrow (a - 9)(b - 9) = 81 = 3^4$$

As $a, b > 0$ and $a \leq b$, there are only 3 ordered pairs, given by $a - 9 = 1, 3$ or 9 and correspondingly $b - 9 = 81, 27, 9$.

QNo:- 95 ,Correct Answer:- 6

Explanation:- The data is shown below.

A B K

1 2 3

The remaining 2 pens can go to different people

(3 ways – 1,1,0; 0,1,1; 1,0,1) or the same person

(3 ways – 2,0,0; 0,2,0; 0,0,2).

Alternately, we can distribute the last 2 identical pens among the three of them using

$x_1 + x_2 + x_3 = 2$, which has 4C_2 non-negative integral solutions, i.e. 6.

QNo:- 96 ,Correct Answer:- 50

Explanation:- The sum of the digits must be a multiple of 3. We can use (A) 2,4,0,3 or (B) 2,4,0,6 or (C) 2,4,3,6

(A) ___ 0 (6 numbers)

___ 2 (4 numbers)

___ 4 (4 numbers)

(B) ___ 0 (6 numbers)

___ 2 (4 numbers)

___ 4 (4 numbers)

___ 6 (4 numbers)

(C) 2, 4, 3, 6 (18 numbers, with even digit in the units place)

There are a total of 50 numbers.

QNo:- 97 ,Correct Answer:- 1

Explanation:- $f(1 \times 1) = f(1) f(1)$ Let $f(1) = x$

$\therefore x = x^2$ i.e., $x = 0$ or 1 . The 'largest' value is 1. Ans:

(1)

Alternately, the function which satisfies the condition is an exponential function of the form $f(a) = a^x$.

When $x = 1$, the largest value of $f(1)$ is $1x$, which is 1.

QNo:- 98 ,Correct Answer:- D

Explanation:- $f(x) = 2x - 5$, $g(x) = 7 - 2x$.

Given, $|f(x) + g(x)| = |f(x)| + |g(x)|$

$$2 = |f(x)| + |g(x)|$$

In the 3 ranges $\left(-\infty, \frac{5}{2}\right]$, $\left[\frac{5}{2}, \frac{7}{2}\right]$ and $\left[\frac{7}{2}, \infty\right)$,

$$|f(x)| + |g(x)| = 2 \text{ only when } x \in \left[\frac{5}{2}, \frac{7}{2}\right]$$

QNo:- 99 ,Correct Answer:- C

Explanation:- For any $n \geq 1$, $a_n = 3(a_{n+1} + a_{n+2} + \dots)$

$\therefore a_1 = 3(a_2 + a_3 + \dots)$ or $r = 1/4$ and

$$a_1 + a_2 + a_3 + \dots = \frac{4a_1}{3} = 32 \text{ (given)} \therefore a_1 = 24$$

The GP is 24, 6, 1.5, $\frac{1.5}{4}$, $\frac{1.5}{16}$,

$$\therefore a_5 = \frac{1.5}{16} = \frac{3}{32}$$

QNo:- 100 ,Correct Answer:- A

Explanation:-

$$a_1 = \frac{1}{2(5)} = \frac{1}{3} \left(\frac{1}{2} - \frac{1}{5} \right)$$

$$a_2 = \frac{1}{5(8)} = \frac{1}{3} \left(\frac{1}{5} - \frac{1}{8} \right)$$

\vdots
 \vdots
 \vdots
 \vdots
 \vdots

$$a_{100} = \frac{1}{299(302)} = \frac{1}{3} \left(\frac{1}{299} - \frac{1}{302} \right)$$

All the terms like $1/5, 1/8, \dots, 1/299$ will cancel out.

$$\therefore \text{The sum} = \frac{1}{3} \left(\frac{1}{2} - \frac{1}{302} \right)$$

$$= \frac{1}{3} \frac{(300)}{(2)(302)} = \frac{50}{302} = \frac{25}{151}$$