

SAT Math Level 2 Subject Test Practice Paper 2

1. The height of a cone is equal to the radius of its base. The radius of a sphere is equal to the radius of the base of the cone. The ratio of the volume of the *cone* to the volume of the *sphere* is

- A. $\frac{1}{12}$
- B. $\frac{1}{4}$
- C. $\frac{1}{3}$
- D. $\frac{1}{1}$
- E. $\frac{4}{3}$

2. In how many distinguishable ways can the seven letters in the word MINIMUM be arranged, if all the letters are used each time?

- A. 7
- B. 42
- C. 420
- D. 840
- E. 5040

3. Which of the following lines are asymptotes of the graph of $y = \frac{x}{x+1}$?

- I. $x = 1$
- II. $x = -1$
- III. $y = 1$

- A. I only
- B. II only
- C. III only
- D. I and II
- E. II and III

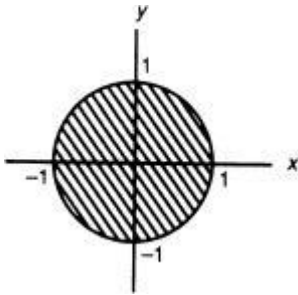
4. What is the probability of getting at least three heads when flipping four coins?

- A. $\frac{3}{16}$
- B. $\frac{1}{4}$
- C. $\frac{5}{16}$
- D. $\frac{7}{16}$
- E. $\frac{3}{4}$

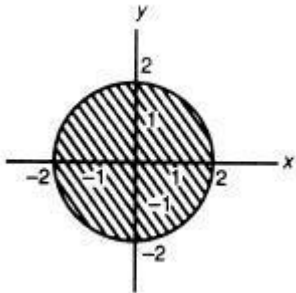
5. The positive zero of $y = 3x^2 - 4x - 5$ is, to the nearest tenth, equal to

- A. 0.8
- B. $0.7 + 1.1i$

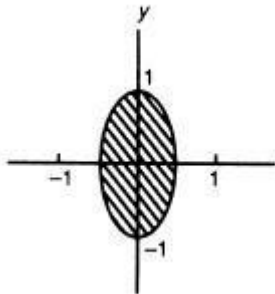
- C. 0.7
- D. 2.1
- E. 2.2



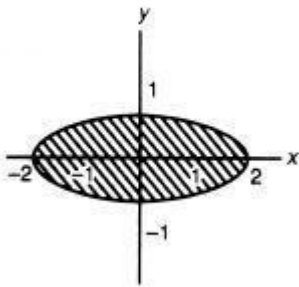
6. In the figure above, S is the set of all points in the shaded region. Which of the following represents the set consisting of all points $(2x,y)$, where (x,y) is a point in S ?



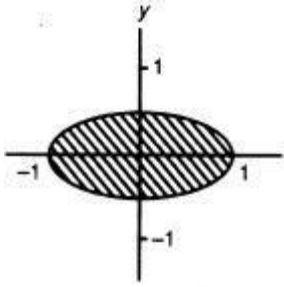
A.



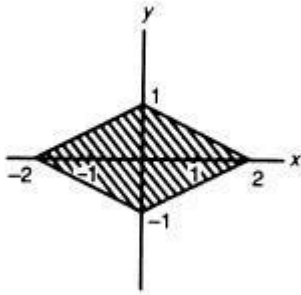
B.



C.



D.



E.

7. If a square prism is inscribed in a right circular cylinder of radius 3 and height 6, the volume inside the cylinder but outside the prism is

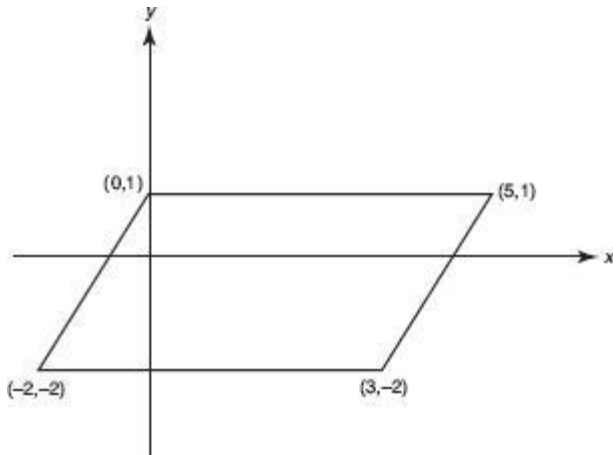
- A. 2.14
- B. 3.14
- C. 61.6
- D. 115.6
- E. 169.6

8. What is the length of the major axis of the ellipse whose equation is $10x^2 + 20y^2 = 200$?

- A. 3.16
- B. 4.47
- C. 6.32
- D. 8.94
- E. 14.14

9. The fifth term of an arithmetic sequence is 26, and the eighth term is 41. What is the first term?

- A. 3
- B. 4
- C. 5
- D. 6
- E. 7



10.

What is the measure of one of the larger angles of the parallelogram that has vertices at $(-2, -2)$, $(0, 1)$, $(5, 1)$, and $(3, -2)$?

- A. 117.2°
- B. 123.7°
- C. 124.9°
- D. 125.3°
- E. 131.0°

11. If $f(x) = \frac{k}{x}$ for all nonzero real numbers, for what value of k does $f(f(x)) = x$?

- A. only 1
- B. only 0
- C. all real numbers
- D. all real numbers except 0
- E. no real numbers

$$F(x) = \begin{cases} \frac{3x^2 - 3}{x - 1}, & \text{when } x \neq 1 \\ k, & \text{when } x = 1 \end{cases}$$

12.

For what value(s) of k is F a continuous function?

- A. 1
- B. 2
- C. 3
- D. 6
- E. no value of k

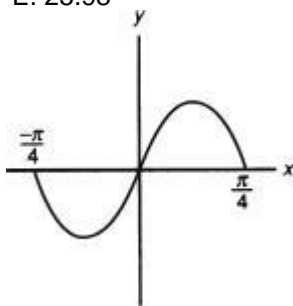
13. If $f(x) = 2x^2 - 4$ and $g(x) = 2^x$, the value of $g(f(1))$ is

- A. -4
- B. 0

- C. $\frac{1}{4}$
- D. 1
- E. 4

14. If $f(x) = 3\sqrt{5x}$, what is the value of $f^{-1}(15)$?

- A. 0.65
- B. 0.9
- C. 5
- D. 7.5
- E. 25.98



15.

Which of the following could be the equation of one cycle of the graph in the figure above?

I. $y = \sin 4x$

II. $y = \cos\left(4x - \frac{\pi}{2}\right)$

III. $y = -\sin(4x + \pi)$

- A. only I
- B. only I and II
- C. only II and III
- D. only II
- E. I, II, and III

16. If $2 \sin^2 x - 3 = 3 \cos x$ and $90^\circ < x < 270^\circ$, the number of values that satisfy the equation is

- A. 0
- B. 1
- C. 2
- D. 3
- E. 4

17. If $A = \tan^{-1}\left(-\frac{3}{4}\right)$ and $A + B = 315^\circ$, then $B =$

- A. 278.13°
- B. 351.87°
- C. -8.13°
- D. 171.87°
- E. 233.13°

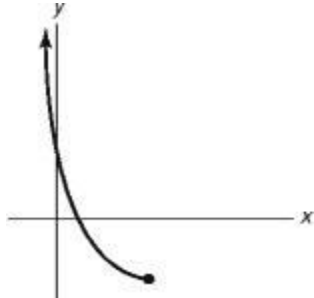
18. Observers at locations due north and due south of a rocket launchpad sight a rocket at a height of 10 kilometers. Assume that the curvature of Earth is negligible and that the rocket's trajectory at that time is perpendicular to the ground. How far apart are the two observers if their angles of elevation to the rocket are 80.5° and 68.0° ?

- A. 0.85 km
- B. 4.27 km
- C. 5.71 km
- D. 20.92 km
- E. 84.50 km

19. The vertex angle of an isosceles triangle is 35° . The length of the base is 10 centimeters. How many centimeters are in the perimeter?

- A. 16.6
- B. 17.4
- C. 20.2
- D. 43.3
- E. 44.9

20. If the graph below represents the function $f(x)$, which of the following could represent the equation of the inverse of f ?



- A. $x = y^2 - 8y - 1$
- B. $x = y^2 + 11$
- C. $x = (y - 4)^2 - 3$
- D. $x = (y + 4)^2 - 3$
- E. $x = (y + 4)^2 + 3$

21. If $k > 4$ is a constant, how would you translate the graph of $y = x^2$ to get the graph of $y = x^2 + 4x + k$?

- A. left 2 units and up k units
- B. right 2 units and up $(k-4)$ units
- C. left 2 units and up $(k-4)$ units
- D. right 2 units and down $(k-4)$ units
- E. left 2 units and down $(k-4)$ units

22. If $f(x) = \log_b x$ and $f(2) = 0.231$, the value of b is

- A. 0.3
- B. 1.3
- C. 13.2
- D. 20.1
- E. 32.5

23. If $f_{n+1} = f_{n-1} + 2f_n$ for $n = 2, 3, 4, \dots$, and $f_1 = 1$ and $f_2 = 1$, then $f_5 =$

- A. 7
- B. 11
- C. 17
- D. 21
- E. 41

24. Suppose $\cos \theta = u$ in $0 < \theta < \frac{\pi}{2}$. Then $\tan \theta =$

- A. 1
- B. $\frac{1}{\sqrt{1-u^2}}$
- C. $\frac{u}{\sqrt{1-u^2}}$
- D. $\frac{\sqrt{1-u^2}}{u}$
- E. $\frac{1}{u}$

25. A certain component of an electronic device has a probability of 0.1 of failing. If there are 6 such components in a circuit, what is the probability that at least one fails?

- A. 0.6
- B. 0.47
- C. 0.167
- D. 0.000006
- E. 0.000001

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