

SAT Math Sample Paper 10

MATHEMATICS SECTION PATTERN

- **Total Questions:** 44 Questions
- **Modules:** 2 Modules (22 Questions each)
- **Time:** 70 Minutes Total (35 Minutes per Module)
- **Content Areas:** Algebra, Advanced Math, Problem-Solving and Data Analysis, Geometry and Trigonometry.
- **Question Formats:** Multiple Choice and Student-Produced Response.

Module 1

1. The function f is defined by $f(x) = 7x + 12$. What is the value of $f(x)$ when $x = 3$?
(A) 21
(B) 31
(C) 33
(D) 35
2. A line in the xy -plane has a slope of 2 and passes through the point $(0, -5)$. Which of the following is an equation of the line?
(A) $y = -5x + 2$
(B) $y = 2x - 5$
(C) $y = 2x + 5$
(D) $y = \frac{1}{2}x - 5$
3. A biologist estimates that a certain population of birds increases by 4% each year. If the initial population is 1,200, which of the following equations models the population P after t years?
(A) $P = 1200(0.04)^t$
(B) $P = 1200(1.04)^t$
(C) $P = 1200(4)^t$
(D) $P = 1200 + 1.04t$
4. If $5x - 10 = 2x + 8$, what is the value of x ?
5. Which of the following expressions is equivalent to $3x^2(4x - 5)$?
(A) $12x^3 - 15x^2$
(B) $12x^2 - 15x$
(C) $7x^3 - 8x^2$
(D) $12x^3 - 5$
6. A right triangle has a hypotenuse of 15 and one leg of 9. What is the length of the other leg?
(A) 6
(B) 10
(C) 12
(D) 14

7. A data set consists of 8, 10, 10, 12, 14, 16. If the number 30 is added to the set, which of the following statistics will increase the most?
- (A) Mean
(B) Median
(C) Mode
(D) Standard Deviation
8. If $x + y = 15$ and $x - y = 3$, what is the value of xy ?
- (A) 18
(B) 45
(C) 54
(D) 60
9. In a right triangle, $\sin \theta = \frac{5}{13}$. What is the value of $\cos(90 - \theta)$?
10. Which of the following is a factor of $x^2 - 11x + 24$?
- (A) $x - 2$
(B) $x - 3$
(C) $x - 11$
(D) $x + 8$
11. A circle in the xy -plane has equation $(x - 4)^2 + (y + 2)^2 = 64$. What is the radius of the circle?
- (A) 4
(B) 8
(C) 16
(D) 64
12. If $|2x - 4| = 10$, what is the sum of all possible values of x ?
- (A) 4
(B) 5
(C) 10
(D) 14
13. A cylinder has a radius of 3 and a height of 10. What is the volume of the cylinder in terms of π ?
- (A) 30π
(B) 60π
(C) 90π
(D) 120π
14. If $2^{x+3} = 32$, what is the value of x ?
15. A store offers a "Buy Two, Get One Free" sale. If each item costs \$15, what is the effective price per item if a customer buys three items?
- (A) \$5
(B) \$7.50
(C) \$10
(D) \$12
16. If $\tan \theta = 1$ and $0 < \theta < 90$, what is the value of $\sin \theta$?
- (A) 0.5

- (B) 0.707
- (C) 0.866
- (D) 1

17. Which of the following lines is perpendicular to $y = -3x + 4$?

- (A) $y = 3x + 1$
- (B) $y = -3x - 4$
- (C) $y = \frac{1}{3}x + 2$
- (D) $y = -\frac{1}{3}x + 5$

18. If $f(x) = x^2 - 6x + 8$, what is the value of $f(2)$?

- (A) 0
- (B) 2
- (C) 4
- (D) 8

19. If the average of 10, 20, 30, 40 and x is 25, what is the value of x ?

20. A square has a diagonal of length $8\sqrt{2}$. What is the area of the square?

- (A) 16
- (B) 32
- (C) 64
- (D) 128

21. Which of the following is equivalent to $\frac{x^2-16}{x-4}$ for $x \neq 4$?

- (A) $x - 4$
- (B) $x + 4$
- (C) $x^2 + 4$
- (D) 8

22. A bag contains 5 red, 3 blue, and 2 yellow marbles. What is the probability of picking a marble that is NOT yellow?

Module 2

23. If $3x + 2y = 12$ and $y = 3$, what is the value of x ?
- (A) 1
(B) 2
(C) 3
(D) 4
24. A line passes through $(1, 4)$ and $(3, 10)$. What is the y -intercept of the line?
- (A) 1
(B) 2
(C) 3
(D) 4
25. If $x^2 + y^2 = 50$ and $xy = 7$, what is the value of $(x - y)^2$?
- (A) 36
(B) 43
(C) 57
(D) 64
26. If $\sqrt{3x + 1} = 4$, what is the value of x ?
27. The population of a town triples every 10 years. If the population in 2020 was 1,000, what is the population in 2040?
- (A) 2,000
(B) 3,000
(C) 6,000
(D) 9,000
28. What is the sum of the solutions to $x^2 - 12x + 32 = 0$?
- (A) 4
(B) 8
(C) 12
(D) 32
29. In the xy -plane, the graph of $y = x^2 - 4x + k$ has its vertex on the x -axis. What is the value of k ?
- (A) 2
(B) 4
(C) 8
(D) 16
30. A cylinder has a volume of 72π . If the radius is 3, what is the height of the cylinder?
- (A) 4
(B) 6
(C) 8
(D) 12
31. If $\cos(x^\circ) = \sin(25^\circ)$ and $0 < x < 90$, what is the value of x ?
32. If $f(x) = \frac{x+2}{x-2}$, for what value of x is $f(x) = 0$?

- (A) -2
- (B) 0
- (C) 2
- (D) Undefined

33. A bag contains 4 red and n blue marbles. If the probability of picking a red marble is 0.25, what is the value of n ?

- (A) 8
- (B) 12
- (C) 16
- (D) 20

34. If $2^{x-1} = 16$, what is the value of x ?

- (A) 3
- (B) 4
- (C) 5
- (D) 6

35. A rectangle has a perimeter of 30. If the length is twice the width, what is the area of the rectangle?

- (A) 25
- (B) 50
- (C) 100
- (D) 200

36. If $|x + 5| + 10 = 5$, how many real solutions exist for x ?

37. In a right triangle ABC , $\angle C = 90^\circ$ and $\tan A = 0.75$. What is the value of $\cos A$?

- (A) 0.6
- (B) 0.75
- (C) 0.8
- (D) 1.25

38. A circle has a diameter of 10. What is the length of an arc that corresponds to a central angle of 180° ?

- (A) 5π
- (B) 10π
- (C) 20π
- (D) 25π

39. What is the distance between the points $(2, 3)$ and $(5, 7)$ in the xy -plane?

- (A) 3
- (B) 4
- (C) 5
- (D) 6

40. If $x + y = 10$ and $x^2 - y^2 = 40$, what is the value of $x - y$?

41. A store buys an item for \$40 and marks up the price by 50%. If the item is then sold at a 20% discount off the marked price, what is the final sale price?

- (A) \$48
- (B) \$50
- (C) \$54

(D) \$60

42. If $h(x) = x^2 - kx + 10$ and $h(3) = 1$, what is the value of k ?

(A) 2

(B) 3

(C) 6

(D) 18

43. A square is inscribed in a circle with a radius of 5. What is the area of the square?

(A) 25

(B) 50

(C) 75

(D) 100

44. If $\sin \theta = 0.8$, what is the value of $\tan \theta$ for an acute angle θ ?

prepp
Your Personal Exam Guide

Answers and Detailed Solutions

1. **C**
Sol: $f(3) = 7(3) + 12 = 33$.
2. **B**
Sol: Slope $m = 2$, y -intercept $b = -5$. Equation: $y = 2x - 5$.
3. **B**
Sol: Growth formula $P = P_0(1 + r)^t$ where $r = 0.04$.
4. **6**
Sol: $3x = 18 \Rightarrow x = 6$.
5. **A**
Sol: $3x^2(4x) - 3x^2(5) = 12x^3 - 15x^2$.
6. **C**
Sol: Leg $= \sqrt{15^2 - 9^2} = 12$.
7. **D**
Sol: Outliers affect Standard Deviation and Mean more than Median or Mode.
8. **C**
Sol: $2x = 18 \Rightarrow x = 9, y = 6$. $9 \times 6 = 54$.
9. **5/13**
Sol: $\cos(90 - \theta) = \sin \theta = 5/13$.
10. **B**
Sol: $(x - 3)(x - 8) = x^2 - 11x + 24$.
11. **B**
Sol: $r^2 = 64$, so $r = 8$.
12. **4**
Sol: $2x - 4 = 10$ and $2x - 4 = -10$. $x = 7, -3$. Sum $= 4$.
13. **C**
Sol: $V = \pi(3^2)(10) = 90\pi$.
14. **2**
Sol: $2^{x+3} = 2^5 \Rightarrow x = 2$.
15. **C**
Sol: Pay for 2 (\$30), get 3. $30/3 = 10$.
16. **B**
Sol: At 45° , $\tan = 1$ and $\sin = 1/\sqrt{2} \approx 0.707$.
17. **C**
Sol: Perpendicular slope is $-1/(-3) = 1/3$.
18. **A**
Sol: $2^2 - 6(2) + 8 = 4 - 12 + 8 = 0$.
19. **25**
Sol: Sum $= 25 \times 5 = 125$. $125 - 100 = 25$.

20. **64**
Sol: Side $s = 8$. Area $= 8^2 = 64$.
21. **B**
Sol: $\frac{(x-4)(x+4)}{x-4} = x + 4$.
22. **0.8**
Sol: Total 10. Not yellow $= 8$. $8/10 = 0.8$.
23. **B**
Sol: $3x + 6 = 12 \Rightarrow 3x = 6 \Rightarrow x = 2$.
24. **A**
Sol: $m = 6/2 = 3$. $4 = 3(1) + b \Rightarrow b = 1$.
25. **A**
Sol: $(x - y)^2 = x^2 + y^2 - 2xy = 50 - 2(7) = 36$.
26. **5**
Sol: $3x + 1 = 16 \Rightarrow x = 5$.
27. **D**
Sol: $1000 \times 3 \times 3 = 9000$.
28. **C**
Sol: Sum $= -b/a = 12$.
29. **B**
Sol: $x = -b/2a = 2$. $2^2 - 4(2) + k = 0 \Rightarrow k = 4$.
30. **C**
Sol: $72\pi = \pi(3^2)h \Rightarrow 72 = 9h \Rightarrow h = 8$.
31. **65**
Sol: $x = 90 - 25 = 65$.
32. **A**
Sol: $x + 2 = 0 \Rightarrow x = -2$.
33. **B**
Sol: $4/(4 + n) = 0.25 \Rightarrow n = 12$.
34. **C**
Sol: $2^{x-1} = 2^4 \Rightarrow x = 5$.
35. **B**
Sol: $2(3w) = 30 \Rightarrow w = 5, l = 10$. Area $= 50$.
36. **0**
Sol: Absolute value cannot be negative.
37. **C**
Sol: 3-4-5 triangle. $\cos A = 4/5 = 0.8$.
38. **A**
Sol: $\pi r = 5\pi$.
39. **C**
Sol: $\sqrt{3^2 + 4^2} = 5$.

40. **4**

Sol: $x - y = 40/10 = 4.$

41. **A**

Sol: $40 \times 1.5 \times 0.8 = 48.$

42. **C**

Sol: $9 - 3k + 10 = 1 \Rightarrow 18 = 3k \Rightarrow k = 6.$

43. **B**

Sol: $\text{Area} = d^2/2 = 100/2 = 50.$

44. **1.33**

Sol: $\cos = \sqrt{1 - 0.8^2} = 0.6. \tan = 0.8/0.6 = 1.33.$

prepp
Your Personal Exam Guide