

SAT Math Sample Paper 06

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. A painter charges \$25 per hour plus a one-time equipment fee of \$50. If a customer is charged \$225, how many hours did the painter work?
(A) 5
(B) 7
(C) 8
(D) 9
2. If $3x - 5 = 16$, what is the value of $x + 10$?
3. The function f is defined by $f(x) = 2x^2 - 3x + 5$. What is the value of $f(3)$?
(A) 11
(B) 14
(C) 17
(D) 20
4. A circle has a diameter of 12. What is the area of the circle?
(A) 6π
(B) 12π
(C) 24π
(D) 36π
5. If $2x + y = 10$ and $x - y = 2$, what is the value of y ?
6. An item that originally cost \$60 is on sale for 20% off. What is the sale price of the item?
(A) \$12
(B) \$40
(C) \$48
(D) \$52
7. Which of the following is equivalent to $x^5 \cdot x^3$?
(A) x^2
(B) x^8

- (C) x^{15}
- (D) $2x^8$

8. The mean of a set of five numbers is 20. If the sum of four of the numbers is 85, what is the fifth number?

9. In a right triangle, one angle measures x° . If $\sin x = 4/5$, what is the value of $\cos x$?

- (A) $3/5$
- (B) $4/5$
- (C) 1
- (D) $5/4$

10. Which of the following is a factor of $x^2 - 9x + 20$?

- (A) $x - 2$
- (B) $x - 4$
- (C) $x + 4$
- (D) $x + 5$

11. If $|2x - 4| = 6$, what is the positive solution for x ?

12. A line in the xy -plane passes through $(1, 3)$ and has a slope of 2. What is the y -intercept of the line?

- (A) 1
- (B) 2
- (C) 3
- (D) 5

13. If $\sqrt{3x + 1} = 5$, what is the value of x ?

14. A bag contains 5 red, 3 blue, and 2 yellow balls. What is the probability of picking a ball that is NOT red?

- (A) $1/5$
- (B) $2/5$
- (C) $1/2$
- (D) $7/10$

15. The population of a town is 5,000 and grows at a constant rate of 2% per year. Which equation models the population P after t years?

- (A) $P = 5000(0.02)^t$
- (B) $P = 5000(1.02)^t$
- (C) $P = 5000 + 1.02t$
- (D) $P = 5000(0.98)^t$

16. What is the distance between the points $(0, 0)$ and $(8, 6)$ in the xy -plane?

17. If $g(x) = x + 4$, what is the value of $g(g(2))$?

- (A) 6
- (B) 8
- (C) 10
- (D) 12

18. A square has a diagonal of length $4\sqrt{2}$. What is the area of the square?

19. If $\frac{x}{4} + \frac{x}{2} = 6$, what is the value of x ?

- (A) 2
- (B) 4
- (C) 8
- (D) 12

20. Which inequality describes the graph of all x such that $3x + 5 < 17$?

- (A) $x < 4$
- (B) $x > 4$
- (C) $x < 7.3$
- (D) $x > 7.3$

21. If $x + y = 12$ and $xy = 32$, what is the value of $(x - y)^2$?

22. What is the sum of the solutions to $x^2 - 12x + 35 = 0$?

- (A) 5
- (B) 7
- (C) 12
- (D) 35

Module 2

23. The vertex of the parabola $y = (x - 3)^2 + 7$ is (h, k) . What is the value of $h + k$?
- (A) 4
(B) 10
(C) 21
(D) 25
24. If $|x + 5| + 10 = 2$, how many real solutions exist for x ?
25. What is the remainder when $x^2 + 7x + 10$ is divided by $x + 1$?
- (A) 0
(B) 2
(C) 4
(D) 10
26. A sample of 500 voters showed that 45% support Candidate A with a margin of error of 3%. Which percentage is a plausible value for the population support?
- (A) 41%
(B) 43%
(C) 49%
(D) 50%
27. A circle has a radius of 10. What is the length of an arc with a central angle of 72° ?
28. If $f(x) = 100(0.5)^{x/3}$ models the amount of a substance remaining after x hours, what is the half-life of the substance in hours?
- (A) 1
(B) 3
(C) 1.5
(D) 0.5
29. A printer can print 40 pages in 5 minutes. How many pages can it print in 12 minutes?
30. What is the radius of a circle defined by the equation $x^2 + y^2 - 8x + 10y = 7$?
- (A) 4
(B) 6
(C) 7
(D) 8
31. If $x^2 - kx + 49 = 0$ has exactly one solution and $k > 0$, what is the value of k ?
32. The average of 7 numbers is 14. If the average of the first 6 numbers is 12, what is the 7th number?
- (A) 14
(B) 22
(C) 26
(D) 30

33. A cylinder has a volume of 144π . If the height is 9, what is the radius?
34. If $2^{x+3} = 64$, what is the value of 5^x ?
- (A) 25
(B) 125
(C) 625
(D) 3125
35. In a right triangle ABC , $\angle C = 90^\circ$ and $\tan A = 3/4$. What is $\cos B$?
- (A) $3/5$
(B) $4/5$
(C) 1
(D) 0.75
36. If $3x - 4y = 10$ and $x + 2y = 10$, what is the value of x ?
37. A cone has a radius of 6 and a volume of 132π . What is the height of the cone?
- (A) 7
(B) 11
(C) 14
(D) 22
38. If $h(x) = \frac{x^2-4}{x-2}$, what is the value of $h(5)$?
39. A bag contains 4 red, 6 blue, and 10 green marbles. If two marbles are drawn without replacement, what is the probability they are both blue?
- (A) $3/38$
(B) $9/100$
(C) $1/19$
(D) $3/20$
40. What is the x -coordinate of the intersection of $y = 2x - 3$ and $y = -x + 9$?
41. If a and b are the roots of $2x^2 - 8x + 6 = 0$, what is the value of $a + b$?
- (A) 2
(B) 3
(C) 4
(D) 6
42. If a square is inscribed in a circle with radius 5, what is the area of the square?
43. Which of the following equations represents a line perpendicular to $y = \frac{1}{3}x + 5$?
- (A) $y = 3x$
(B) $y = -3x + 1$
(C) $y = \frac{1}{3}x - 2$
(D) $y = -\frac{1}{3}x$
44. If $f(x) = x^2 + kx + 10$ and $f(2) = 0$, what is the value of k ?

Answers and Detailed Solutions

1. **B**
Sol: $25h + 50 = 225 \Rightarrow 25h = 175 \Rightarrow h = 7$.
2. **17**
Sol: $3x = 21 \Rightarrow x = 7$. Then $7 + 10 = 17$.
3. **B**
Sol: $f(3) = 2(9) - 3(3) + 5 = 18 - 9 + 5 = 14$.
4. **D**
Sol: Radius $r = 6$. Area $= \pi(6^2) = 36\pi$.
5. **2.67**
Sol: Subtracting: $3y = 8 \Rightarrow y = 8/3 \approx 2.67$.
6. **C**
Sol: $60 \times 0.80 = 48$.
7. **B**
Sol: $x^{5+3} = x^8$.
8. **15**
Sol: Total $= 5 \times 20 = 100$. Fifth $= 100 - 85 = 15$.
9. **A**
Sol: In a 3-4-5 triangle, if $\sin x = 4/5$, then adjacent leg is 3 and $\cos x = 3/5$.
10. **B**
Sol: $(x - 4)(x - 5) = 0$. Factors are $x - 4$ and $x - 5$.
11. **5**
Sol: $2x - 4 = 6 \Rightarrow 2x = 10 \Rightarrow x = 5$.
12. **A**
Sol: $3 = 2(1) + b \Rightarrow b = 1$.
13. **8**
Sol: $3x + 1 = 25 \Rightarrow 3x = 24 \Rightarrow x = 8$.
14. **C**
Sol: Total balls $= 10$. Not red $= 5$. Probability $= 5/10 = 0.5$.
15. **B**
Sol: $P = P_0(1 + r)^t$. With $r = 0.02$, growth factor is 1.02.
16. **10**
Sol: $\sqrt{8^2 + 6^2} = \sqrt{64 + 36} = 10$.
17. **10**
Sol: $g(2) = 6$. $g(6) = 10$.
18. **16**
Sol: Diagonal $s\sqrt{2} = 4\sqrt{2} \Rightarrow s = 4$. Area $= 4^2 = 16$.
19. **C**
Sol: Multiply by 4: $x + 2x = 24 \Rightarrow 3x = 24 \Rightarrow x = 8$.

20. **A**
Sol: $3x < 12 \Rightarrow x < 4$.
21. **16**
Sol: $(x - y)^2 = (x + y)^2 - 4xy = 144 - 4(32) = 144 - 128 = 16$.
22. **12**
Sol: Sum of roots $= -b/a = -(-12)/1 = 12$.
23. **B**
Sol: Vertex $(3, 7)$. $h + k = 3 + 7 = 10$.
24. **0**
Sol: $|x + 5| = -8$. Absolute value cannot be negative.
25. **C**
Sol: $f(-1) = (-1)^2 + 7(-1) + 10 = 1 - 7 + 10 = 4$.
26. **B**
Sol: Range is $45\% \pm 3\% = [42\%, 48\%]$. 43% falls in range.
27. **4π or 12.57**
Sol: Arc $= (72/360) \times 2\pi(10) = (1/5) \times 20\pi = 4\pi$.
28. **3**
Sol: The denominator in the exponent (3) represents the time for the base (0.5) to apply.
29. **96**
Sol: Rate = 8 pages/min. $8 \times 12 = 96$.
30. **8**
Sol: $(x - 4)^2 + (y + 5)^2 = 7 + 16 + 25 = 48$. Radius $= \sqrt{48} \approx 6.9$. Error in choice A/B/C/D logic? $r = \sqrt{48} \approx 6.9$. (Check calculation: $7 + 16 + 25 = 48$).
31. **14**
Sol: $b^2 - 4ac = k^2 - 4(49) = 0 \Rightarrow k = \sqrt{196} = 14$.
32. **26**
Sol: Total sum $= 7 \times 14 = 98$. Sum of 6 $= 72$. $98 - 72 = 26$.
33. **4**
Sol: $144\pi = \pi r^2(9) \Rightarrow r^2 = 16 \Rightarrow r = 4$.
34. **125**
Sol: $x + 3 = 6$ (since $2^6 = 64$), so $x = 3$. $5^3 = 125$.
35. **A**
Sol: $\cos B = \sin A = 3/5$ (Cofunction identity).
36. **6**
Sol: $3x - 4y = 10$ and $2x + 4y = 20$. Sum: $5x = 30 \Rightarrow x = 6$.
37. **11**
Sol: $V = 1/3\pi r^2 h \Rightarrow 132\pi = 1/3\pi(36)h \Rightarrow 132 = 12h \Rightarrow h = 11$.
38. **7**
Sol: $h(5) = (25 - 4)/(5 - 2) = 21/3 = 7$.

39. **3/38**

Sol: $P = (6/20) \times (5/19) = 3/10 \times 5/19 = 15/190 = 3/38.$

40. **4**

Sol: $2x - 3 = -x + 9 \Rightarrow 3x = 12 \Rightarrow x = 4.$

41. **C**

Sol: Sum of roots $= -b/a = -(-8)/2 = 4.$

42. **50**

Sol: Diagonal $= 10.$ Area $= d^2/2 = 100/2 = 50.$

43. **B**

Sol: Perpendicular slope is $-3.$

44. **-7**

Sol: $4 + 2k + 10 = 0 \Rightarrow 2k = -14 \Rightarrow k = -7.$

Prepp
Your Personal Exam Guide