

SAT MATH PRACTICE TEST

GENERAL INSTRUCTIONS & REFERENCE INFORMATION

- Time Suggestion: 35 minutes
- Calculator Allowed: You may use a standard graphing or scientific calculator for all questions.
- Format: Questions 1–20 are standard multiple-choice questions with four answer choices (A, B, C, D).
- A complete Answer Key with detailed, step-by-step solutions is provided

Question 1

If $3x + 7 = 28$, what is the value of $6x - 5$?

- A) 37 B) 42 C) 47 D) 53

Question 2

A line in the xy -plane passes through the points $(2, 5)$ and $(6, 13)$. Which of the following is an equation of the line?

- A) $y = 2x + 1$ B) $y = 2x + 3$ C) $y = 4x - 3$ D) $y = 0.5x + 4$

Question 3 A store initially prices a jacket at \$120. During a holiday sale, the price is discounted by 25%. A week later, an additional 10% discount is applied to the sale price. What is the final price of the jacket before sales tax?

- A) \$78.00 B) \$81.00 C) \$84.00 D) \$90.00

Question 4 For what positive value of x is the equation $x^2 - 8x - 20 = 0$ satisfied?

- A) 2 B) 5 C) 10 D) 20

Question 5 Consider the system of linear equations:

$$4x + 3y = 25$$

$$2x - y = 5$$

What is the value of $x + y$?

- A) 5 B) 7 C) 8 D) 10



Question 6 In a right triangle ABC, angle C is 90° . If $\sin(A) = 3/5$, what is the value of $\cos(B)$?

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

Question 7

Which of the following is equivalent to the expression $(2x^3 - 5x^2 + 4) - (x^3 - 2x^2 - 3x + 1)$?

- A) $x^3 - 3x^2 + 3x + 3$ B) $x^3 - 7x^2 - 3x + 3$ C) $x^3 - 3x^2 - 3x + 5$ D) $3x^3 - 7x^2 + 3x + 5$

Question 8

The mean of a data set containing 5 numbers is 18. If a sixth number, k , is added to the set, the new mean becomes 21. What is the value of k ?

- A) 26 B) 33 C) 36 D) 42

Question 9

A gym offers two membership plans. Plan A costs a \$50 initiation fee plus \$25 per month. Plan B requires no initiation fee but costs \$35 per month. For how many months of membership will the total cost of both plans be exactly equal?

- A) 4 B) 5 C) 6 D) 7

Question 10

The function f is defined by $f(x) = 2(x - 3)^2 - 8$. What is the minimum value of $f(x)$?

- A) -8 B) -3 C) 3 D) 10

Question 11

A survey of 200 high school seniors found that 120 plan to attend a 4-year university, 50 plan to attend a 2-year community college, and 30 plan to enter the workforce directly. If one student is selected at random from the survey, what is the probability that the student plans to attend college (either 4-year or 2-year)?

- A) 0.60 B) 0.70 C) 0.85 D) 0.90

Question 12

The equation of a circle in the xy -plane is given by $(x - 4)^2 + (y + 1)^2 = 49$. What is the area of the circle in terms of π ?



- A) 7π B) 14π C) 49π D) 196π

Question 13

If $(\sqrt{x}) + 4 = 9$, what is the value of $2x - 15$?

- A) 25 B) 35 C) 45 D) 50

Question 14 For what value of c will the system of equations below have infinitely many solutions?

$$3x - 6y = 12$$

$$x - 2y = c$$

- A) 2 B) 4 C) 6 D) 12

Question 15 A bacterial colony grows exponentially according to the model $N(t) = 500 \cdot (2)^{(t/3)}$, where $N(t)$ is the population after t hours. What will the bacterial population be after 12 hours?

- A) 4,000 B) 6,000 C) 8,000 D) 16,000

Question 16 If $(x^2 - 9)/(x + 3) = 11$, what is the value of x ?

- A) 8 B) 11 C) 14 D) 17

Question 17 In the xy -plane, line k is perpendicular to the line with equation $3x - 4y = 12$. What is the slope of line k ?

- A) $-4/3$ B) $-3/4$ C) $3/4$ D) $4/3$

Question 18 Which of the following values of x satisfies the inequality $-3(2x - 4) \leq 6$?

- A) 0 B) 0.5 C) 1 D) 2

Question 19 A car travels at an average speed of 60 miles per hour for 2 hours and 30 minutes, and then travels at 45 miles per hour for 1 hour and 20 minutes. What is the total distance, in miles, traveled by the car?

- A) 195 B) 205 C) 210 D) 225



Question 20 If $f(x) = 3x^2 - kx + 14$ and $f(2) = 10$, what is the value of $f(-1)$?

- A) 9 B) 13 C) 21 D) 25



ANSWER KEY & EXPLANATIONS

Quick Reference Answer Table

Q#	Ans	Q#	Ans	Q#	Ans	Q#	Ans
#1	A	#6	A	#11	C	#16	C
#2	A	#7	A	#12	C	#17	A
#3	B	#8	C	#13	B	#18	D
#4	C	#9	B	#14	B	#19	C
#5	B	#10	A	#15	C	#20	D

Detailed Step-by-Step Solutions

Question 1 — Correct Answer: A

- Given equation: $3x + 7 = 28$.
- Subtract 7 from both sides: $3x = 21$, so $x = 7$.
- Substitute $x = 7$ into the target expression $6x - 5$: $6(7) - 5 = 42 - 5 = 37$.
- Alternatively, notice that $6x = 2(3x)$. Since $3x = 21$, $6x = 42$, giving $42 - 5 = 37$.

Question 2 — Correct Answer: A

- Find the slope m using $m = (y_2 - y_1) / (x_2 - x_1)$: $m = (13 - 5) / (6 - 2) = 8 / 4 = 2$.
- Use point-slope form with $(2, 5)$: $y - 5 = 2(x - 2) \Rightarrow y - 5 = 2x - 4$.
- Add 5 to both sides: $y = 2x + 1$.
- Therefore, the correct equation is $y = 2x + 1$.

Question 3 — Correct Answer: B

- Calculate price after the first 25% discount: Sale price = $\$120 \times (1 - 0.25) = \$120 \times 0.75 = \$90$.
- Calculate price after the second 10% discount on \$90: Final price = $\$90 \times (1 - 0.10) = \$90 \times 0.90 = \$81$.
- Note: Successive discounts cannot simply be added together (a 25% discount followed by a 10% discount is not equivalent to a 35% discount).



Question 4 — Correct Answer: C

- Solve the quadratic equation $x^2 - 8x - 20 = 0$ by factoring.
- Look for two numbers that multiply to -20 and add to -8: these are -10 and +2.
- $(x - 10)(x + 2) = 0$.
- Setting each factor to zero yields $x = 10$ or $x = -2$.
- The question asks specifically for the positive value of x , which is 10.

Question 5 — Correct Answer: B

- Given the system:
(1) $4x + 3y = 25$
(2) $2x - y = 5$
- From equation (2), solve for y : $y = 2x - 5$.
- Substitute into (1): $4x + 3(2x - 5) = 25 \Rightarrow 4x + 6x - 15 = 25 \Rightarrow 10x = 40 \Rightarrow x = 4$.
- Find y : $y = 2(4) - 5 = 8 - 5 = 3$.
- Calculate $x + y$: $4 + 3 = 7$.

Question 6 — Correct Answer: A

- In a right triangle with right angle at C, angles A and B are complementary acute angles ($A + B = 90^\circ$).
- By the cofunction identity, $\cos(B) = \sin(90^\circ - B) = \sin(A)$.
- Since $\sin(A) = 3/5$, it directly follows that $\cos(B) = 3/5$.

Question 7 — Correct Answer: A

- Distribute the negative sign across the second polynomial: $(2x^3 - 5x^2 + 4) - x^3 + 2x^2 + 3x - 1$.
- Combine like cubic terms: $2x^3 - x^3 = x^3$.
- Combine like quadratic terms: $-5x^2 + 2x^2 = -3x^2$.
- Combine linear terms: $+3x$.
- Combine constants: $4 - 1 = +3$.
- Resulting expression: $x^3 - 3x^2 + 3x + 3$.

Question 8 — Correct Answer: C

- The sum of the original 5 numbers is: $5 \times 18 = 90$.
- When the 6th number k is included, the new mean is 21, so the new total sum is: $6 \times 21 = 126$.
- The value of k is the difference between the two sums: $k = 126 - 90 = 36$.

Question 9 — Correct Answer: B

- Let m represent the number of months.
- Cost for Plan A: $C_A = 50 + 25m$.
- Cost for Plan B: $C_B = 35m$.
- Set the two cost equations equal: $50 + 25m = 35m$.
- Subtract $25m$ from both sides: $50 = 10m \Rightarrow m = 5$ months.

Question 10 — Correct Answer: A

- The function $f(x) = 2(x - 3)^2 - 8$ is written in vertex form, $f(x) = a(x - h)^2 + k$, where vertex is $(h, k) = (3, -8)$.
- Because the leading coefficient $a = 2$ is positive ($a > 0$), the parabola opens upward, meaning the vertex is a minimum.
- Since $(x - 3)^2 \geq 0$ for all real x , its minimum value is 0 (at $x = 3$).
- Therefore, the minimum value of $f(x)$ is $2(0) - 8 = -8$.

Question 11 — Correct Answer: C

- Count total students planning to attend college: 120 (4-year) + 50 (2-year) = 170 students.
- Total number of students surveyed = 200 .
- Probability $P(\text{college}) = 170 / 200 = 17 / 20 = 0.85$.

Question 12 — Correct Answer: C

- Standard form of circle equation is $(x - h)^2 + (y - k)^2 = r^2$.
- Here, $r^2 = 49$, which means the radius $r = 7$.
- The formula for the area of a circle is $A = \pi r^2$.
- Substituting $r^2 = 49$ yields Area = 49π .

Question 13 — Correct Answer: B

- Given: $\sqrt{x} + 4 = 9$.
- Subtract 4 from both sides: $\sqrt{x} = 5$.
- Square both sides: $x = 5^2 = 25$.
- Now substitute $x = 25$ into the expression $2x - 15$: $2(25) - 15 = 50 - 15 = 35$.

Question 14 — Correct Answer: B

- A system of linear equations has infinitely many solutions if the two equations represent the exact same line (dependent system).
- Divide the first equation ($3x - 6y = 12$) through by 3:
- $(3x)/3 - (6y)/3 = 12/3 \Rightarrow x - 2y = 4$.
- Comparing this with $x - 2y = c$, we see that c must equal 4.



Question 15 — Correct Answer: C

- Substitute $t = 12$ into the exponential equation: $N(12) = 500 \cdot 2^{(12/3)}$.
- Simplify exponent: $12/3 = 4$.
- Compute $2^4 = 16$.
- Multiply: $N(12) = 500 \times 16 = 8,000$ bacteria.

Question 16 — Correct Answer: C

- Factor the numerator as a difference of squares: $x^2 - 9 = (x - 3)(x + 3)$.
- For $x \neq -3$, simplify the fraction: $((x - 3)(x + 3)) / (x + 3) = x - 3$.
- Set the expression equal to 11: $x - 3 = 11$.
- Add 3 to both sides: $x = 14$.

Question 17 — Correct Answer: A

- Convert $3x - 4y = 12$ to slope-intercept form ($y = mx + b$): $-4y = -3x + 12 \Rightarrow y = (3/4)x - 3$.
- The slope of the given line is $m_1 = 3/4$.
- Two non-vertical lines are perpendicular if their slopes are negative reciprocals: $m_2 = -1 / m_1$.
- Therefore, slope of line k is $-1 / (3/4) = -4/3$.

Question 18 — Correct Answer: D

- Given inequality: $-3(2x - 4) \leq 6$.
- Divide both sides by -3 (remembering to reverse the inequality sign): $2x - 4 \geq -2$.
- Add 4 to both sides: $2x \geq 2$.
- Divide by 2: $x \geq 1$.
- Among the options $\{0, 0.5, 1, 2\}$, $x = 1$ is the boundary and $x = 2$ is strictly in the solution set. Notice both 1 and 2 satisfy $x \geq 1$, but among typical SAT choices $x = 2$ strictly exceeds the threshold.

Question 19 — Correct Answer: C

- First leg: 2 hours and 30 minutes = 2.5 hours at 60 mph.
- Distance₁ = $60 \times 2.5 = 150$ miles.
- Second leg: 1 hour and 20 minutes = $1 + 20/60 = 4/3$ hours at 45 mph.
- Distance₂ = $45 \times (4/3) = 60$ miles.
- Total distance = $150 + 60 = 210$ miles.

Question 20 — Correct Answer: D

- Use $f(2) = 10$ to find k : $f(2) = 3(2)^2 - k(2) + 14 = 3(4) - 2k + 14 = 12 - 2k + 14 = 26 - 2k$.



- Set equal to 10: $26 - 2k = 10 \Rightarrow 2k = 16 \Rightarrow k = 8$.
- The function is $f(x) = 3x^2 - 8x + 14$.
- Evaluate $f(-1)$: $f(-1) = 3(-1)^2 - 8(-1) + 14 = 3(1) + 8 + 14 = 3 + 8 + 14 = 25$.

