SAT Math Practice

Use this key to check answers and read the explanations.

1. An aquarium contains 11 liters of water. After three equal buckets of water are added, it contains 47 liters. How many liters of water did each bucket contain?

A. 12 liters
B. 9 liters
C. 15 liters
D. 18 liters

Correct answer: A. 12 liters
The buckets added 47 − 11 = 36 liters in total. Dividing by three gives 12 liters per bucket.

2. A computer model takes $T(n) = 9 \times 2^n$ seconds to render a scene at setting n. How many seconds does it take at setting n = 3?

A. 54 seconds
B. 27 seconds
C. 72 seconds
D. 81 seconds

Correct answer: C. 72 seconds
At n = 3 the power 2^3 equals 8. The render time is 9 × 8 = 72 seconds.

3. A map uses 1.5 centimeters for every 6 kilometers on the ground. How far apart are two markers whose straight-line distance is 4 centimeters on the map?

A. 9 kilometers
B. 16 kilometers
C. 12 kilometers
D. 24 kilometers

Correct answer: B. 16 kilometers
Each map centimeter represents 6 ÷ 1.5 = 4 kilometers. Four centimeters therefore represent 16 kilometers.

4. A right triangle has side lengths of 12, 16, and 20. What is the cosine of its smaller acute angle?

A. 5/4
B. 3/5
C. 3/4
D. 4/5

Correct answer: D. 4/5
The smaller angle is opposite the shorter leg, 12. The adjacent leg is 16 and the hypotenuse is 20, so cosine is 16/20 = 4/5.

5. Which expression equals √(72u²) for every positive value of u?

A. 36u√2
B. 6u√2
C. 6u²√2
D. 12u√2

Correct answer: B. 6u√2
Write 72u² as (6u)² × 2. Since u is positive, the square root of (6u)² is 6u.

6. A 33-minute rehearsal has six blocks. Each block is either a 7-minute run-through or a 4-minute feedback session. How many run-throughs are in the rehearsal?

A. 3
B. 2
C. 4
D. 5

Correct answer: A. 3
Six feedback sessions would take 24 minutes. Each run-through adds 3 minutes in place of a feedback session, so the 9 extra minutes account for three run-throughs.

7. The functions p and q are linear. The recorded values are p(2) = 19, p(5) = 34, q(2) = 20, and q(6) = 32. By how much does the slope of p exceed the slope of q?

A. 8
B. 1
C. 3
D. 2

Correct answer: D. 2
The slope of p is (34 − 19) ÷ (5 − 2) = 5. The slope of q is (32 − 20) ÷ (6 − 2) = 3. The difference is 2.

8. At 9 a.m. and 10 a.m. a kiosk served 47 and 46 visitors. Model A predicted 44 and 48. Model B predicted 49 and 41. Which model was closer to the observed count at each time, in order?

A. Model A at 9 a.m. and Model B at 10 a.m.
B. Model A at both times
C. Model B at 9 a.m. and Model A at 10 a.m.
D. Model B at both times

Correct answer: C. Model B at 9 a.m. and Model A at 10 a.m.
At 9 a.m. the absolute errors are 3 for A and 2 for B. At 10 a.m. they are 2 for A and 5 for B. The smaller errors come from B, then A.

9. Two canisters are right circular cylinders. Canister B has twice the radius and three-fourths the height of canister A. What is the ratio of B's volume to A's volume?

A. 3 to 1
B. 3 to 2
C. 9 to 4
D. 4 to 1

Correct answer: A. 3 to 1
Cylinder volume is $\pi r^2 h$. Doubling the radius multiplies the base area by 4. The height multiplies the volume by another factor of 3/4, giving 3 times the original volume.

10. For a quadratic function g, g(2) and g(10) both equal 7. If g(5) = 15, what is g(7)?

A. 23
B. 7
C. 11
D. 15

Correct answer: D. 15
Equal values at 2 and 10 put the axis of symmetry halfway between them at x = 6. The inputs 5 and 7 are each 1 unit from the axis, so their outputs match.

11. A school orders exactly 28 display stands. Small stands cost $4, large stands $7. The order must include at least 7 large stands and cost at most $148. Which range gives all possible counts of large stands?

A. 7 through 15
B. 7 through 11
C. 7 through 12
D. 12 through 28

Correct answer: C. 7 through 12
If n stands are large, the cost is $4(28 - n) + 7n = 112 + 3n$. The budget requires $n \le 12$ and the minimum requires $n \ge 7$. Both endpoints are allowed.

12. Which numbers are real solutions of $\sqrt{(4x + 13)} = x - 2$?

A. −1 only
B. 9 only
C. −1 and 9
D. No real solutions

Correct answer: B. 9 only
Squaring gives $(x - 9)(x + 1) = 0$. In the original equation, x = 9 makes both sides 7. At x = −1, the square root is 3 and the right side is −3.

13. For which value of k do the graphs $y = (x - 4)^2 + 3$ and $y = k - 2x$ meet at exactly one point?

A. 19
B. 3
C. 11
D. 10

Correct answer: D. 10
Set the expressions for y equal and rearrange to $k = (x - 3)^2 + 10$. Its minimum, 10, occurs only at $x = 3$. Larger values give two intersections and smaller values give none.

14. Lakeview estimates 63% use library pickup, with a margin of 5 percentage points. Cedar Park estimates 42% do not use it, with a margin of 4 points. Where do the implied ranges for pickup use overlap?

A. 58% through 62%
B. 54% through 58%
C. 62% through 68%
D. 38% through 46%

Correct answer: A. 58% through 62%
Lakeview's range is 58% to 68%. Cedar Park's non-use range is 38% to 46%, so its use range is 54% to 62%. The overlap is 58% to 62%.

15. Points (−5, 2) and (3, 8) are opposite ends of a circle's diameter. Which equation describes the circle?

A. $(x + 1)^2 + (y - 5)^2 = 100$
B. $(x - 1)^2 + (y + 5)^2 = 25$
C. $(x + 1)^2 + (y - 5)^2 = 25$
D. $(x + 1)^2 + (y - 5)^2 = 5$

Correct answer: C. $(x + 1)^2 + (y - 5)^2 = 25$
The midpoint is (−1, 5). The endpoints are 10 units apart because $\sqrt{(8^2 + 6^2)} = 10$. The radius is 5, so the squared distance from the center equals 25.