ACT Math Practice

Use this key to check answers and read the explanations.

1. What is the value of $9 - 2(3 - 7)$?
   - A. 17
   - B. 1
   - C. 13
   - D. −17

   Correct answer: A. 17
   The parenthesis equals −4, so the expression becomes $9 - (-8)$, which is 17.

2. Which value of x satisfies $5(x - 2) = 2x + 11$?
   - A. 21
   - B. 3
   - C. 7
   - D. 1/3

   Correct answer: C. 7
   Expanding and collecting terms gives $3x = 21$. Divide by 3 to get 7.

3. A regular polygon has an exterior angle of 24° at each vertex. How many sides does it have?
   - A. 12
   - B. 15
   - C. 18
   - D. 24

   Correct answer: B. 15
   The exterior turns add to 360°. There are $360 \div 24 = 15$ identical turns.

4. If $f(x) = 2x^2 - 3x + 1$, what is $f(-2)$?
   - A. −13
   - B. 3
   - C. −1
   - D. 15

   Correct answer: D. 15
   Substitution gives $2 \times 4 - 3(-2) + 1 = 8 + 6 + 1 = 15$.

5. A bin contains 5 blue, 3 yellow, and 4 gray clips. One clip is chosen uniformly at random. What is the probability that it is blue or gray?

A. 5/12
B. 3/4
C. 1/4
D. 2/3

Correct answer: B. 3/4
Nine out of the 12 clips are blue or gray, so the probability is 9/12 = 3/4.

6. A line through (−2, 5) and (4, −4) has what slope?

A. −3/2
B. −2/3
C. 3/2
D. −1/6

Correct answer: A. −3/2
The slope is the change in y, −9, divided by the change in x, 6. This simplifies to −3/2.

7. A greenhouse orders 17 trays of seedlings. Each herb tray holds 6 plants and each flower tray holds 9. The 17 trays contain 129 plants. How many herb trays are in the order?

A. 5
B. 9
C. 11
D. 8

Correct answer: D. 8
Seventeen flower trays would hold 153 plants. Each substitution of an herb tray reduces the count by 3, so 24 ÷ 3 = 8 trays are for herbs.

8. For every nonzero a and b, which expression equals $(a^3b^{-2})^2 \div (ab^{-1})$?

A. a^7/b^3
B. a^5/b^5
C. a^5/b^3
D. a^5b^3

Correct answer: C. a^5/b^3
Squaring gives a^6b^{-4}. Division subtracts the exponents, yielding a^5b^{-3}.

9. Angle θ is acute, and sin θ = 8/17. What is tan θ?

A. 8/15
B. 15/17
C. 15/8
D. 8/17

Correct answer: A. 8/15
With opposite leg 8 and hypotenuse 17, the adjacent leg is √(289 − 64) = 15. Tangent is opposite divided by adjacent.

10. Five numbers have mean 14. Four are 9, 11, 17, and 19. What is the median of all five numbers?

A. 16
B. 11
C. 17
D. 14

Correct answer: D. 14
The sum is 5 × 14 = 70. The four shown total 56, so the missing value is 14, which lies in the middle of the ordered list.

11. Let $f(x) = 3x - 2$ and $g(x) = x^2 + 4$. Which expression is $g(f(x))$?

A. $9x^2 + 8$
B. $3x^2 + 10$
C. $9x^2 - 12x + 8$
D. $9x^2 - 6x + 8$

Correct answer: C. $9x^2 - 12x + 8$
Substitute $3x - 2$ for x in g. Expanding $(3x - 2)^2 + 4$ gives $9x^2 - 12x + 8$.

12. Two printers charge fixed fees plus a per-copy fee. Plan A costs $18 plus $0.12 per copy. Plan B costs $30 plus $0.07 per copy. What is the smallest whole number of copies for which Plan B costs less than Plan A?

A. 240
B. 241
C. 150
D. 601

Correct answer: B. 241
Solve $30 + 0.07n < 18 + 0.12n$ to get $12 < 0.05n$, so $n > 240$. At 240 the costs are equal.

13. Two badges are drawn at random without replacement from a box with 5 red and 3 silver badges. What is the probability of drawing one of each color?

A. 25/64
B. 15/56
C. 1/2
D. 15/28

Correct answer: D. 15/28
The two possible orders have probabilities (5/8)(3/7) and (3/8)(5/7). Their sum is 30/56 = 15/28.

14. A circle is centered at (−3, 4) and passes through (1, 7). Which point also lies on the circle?

A. (−6, 0)
B. (−7, 2)
C. (2, 5)
D. (−3, 8)

Correct answer: A. (−6, 0)
The squared radius is $4^2 + 3^2 = 25$. The offset from the center to (−6, 0) is (−3, −4), whose squares also sum to 25.

15. For a real number k, the equation $x^2 - kx + 16 = 0$ has two distinct positive real solutions. Which condition on k is necessary and sufficient?

A. $k < -8$
B. $k \geq 8$
C. $k > 8$
D. $-8 < k < 8$

Correct answer: C. $k > 8$
Two distinct real roots require $k^2 - 64 > 0$. Their product is 16, so they have the same sign. Their sum equals k, so both are positive only when $k > 8$.