Strategies (All)

1. What is the value of the expression $a^2 + 2a + 2ab + 2b + b^2$ when $a + b = 25$?
   A) 25
   B) 625
   C) 675
   D) 2600

2. Which of the following (x, y) pairs is a solution to the equations $x - y = 7$ and $4x - y = 46$?
   A) $(6, 13)$
   B) $(7, 14)$
   C) $(13, 6)$
   D) $(14, 7)$

3. Heading into the last test of the semester, Julian had scored $78, 91, 64,$ and 95 on the previous four exams. After the last test, Julian had an overall test average somewhere in the B range $(80\% - 89\%)$ for the semester. Which of the following could NOT have been the score of his final exam?
   A) 68
   B) 72
   C) 95
   D) 100

4. If a is an odd integer and b is an even integer, then which of the following produces an odd integer?
   A) $2a + b$
   B) $2a - b$
   C) ab
   D) $3a - b$

5. A function $f(x)$ is defined as $f(x) = 4^{5x-7}$. What is x when $f(x) = 64$?
   A) 2
   B) 3
   C) 4
   D) 5

6. In the xy-plane, line y has slope $\frac{2}{5}$, and line z has slope $\frac{5}{2}$. Both lines contain the point $(0,0)$. For which of these lines is $y < x$ for all negative values of x ?

       I. Line y

       II. Line z

A) I only
B) II only
C) I and II
D) Neither I nor II

7. Given that $h > j > 0$ and $(h + j) < (h^2 - j^2)$, then $(h - j)$ must be:
A) less than 1.
B) greater than 1.
C) greater than $(h + j)$.
D) equal to $(h + j)$.

8. $$x^2 - 2x - 4 = 0$$

What is a solution to the given equation?

A) $-2 + \sqrt{10}$
B) $-1 + \sqrt{5}$
C) $1 + \sqrt{5}$
D) $2 + \sqrt{10}$

9. At the beginning of a certain year, the price of a restaurant's burger was \$12. By the end of that year, the price had increased by $q\%$. Which expression represents the price of the restaurant's burger, in dollars, at the end of that year?

A) $12 + q$

B) $12(1 + q)$

C) $(12q)(100)$

D) $12(1 + \frac{q}{100})$

10. The polynomial $81x^2 + 27x - 10$ is equivalent to the product of $(9x + 5)$ and which of the following binomials?

A) $(-9x - 9)$

B) $(-9x - 2)$

C) $(9x + 2)$

D) $(9x - 2)$

11. A line contains the points A, B, C, and D. Point D is between points A and B. Point C is between points D and B. Which of the following inequalities must be true about the lengths of these segments?

A) $BC < CD$

B) $CD < BC$

C) $AB < DB$

D) $DB < AB$

12.
$$\frac{x^2(x-4)-16(x-4)}{x^2-8x+16}$$

If $x > 4$, which of the following expressions is equivalent to the given expression?

A) $x + 4$

B) $(x + 4)(x - 4)$

C) $(x - 4)^2$

D) $(x + 4)^2$

13. In a right triangle, one angle measures $x°$, and $\sin x° = \frac{3}{5}$. What is $\cos(90 - x°)$?

A) $\frac{2}{5}$

B) $\frac{3}{5}$

C) $\frac{3}{4}$

D) $\frac{4}{5}$

14.
$$x^2 + b = 0$$

In the quadratic equation shown, b is a constant. For which of the following values of b will the equation have one real solution?

A) -4
B) -2
C) $\quad 0$
D) $\quad 2$

15. The side of a square is t feet longer than the side of a second square. How many feet longer is the diagonal of the first square than the diagonal of the second square?

A) $\sqrt{2}t$
B) $2t$
C) $4t$
D) $\quad t^2$

16. A circle in the xy-plane intersects the y-axis at $(0,8)$ and $(0,-8)$. The radius of the circle is 10 coordinate units. Which of the following could be the center of the circle?

      I. $(-6, 0)$
     II. $(\quad 0, 0)$
    III. $(\quad 6, 0)$

A) I only
B) II only
C) III only
D) I and III only