

1) Let $A = \{ x \mid x \text{ is a natural odd number greater than 3 and less than 10} \}$
 $B = \{ y \mid y = | -x | - 1, x \text{ is a whole number} < 5 \}$ and
 $C = \{ x \mid x \text{ is a whole even number less than 7} \}$. Then $(A \cup B) \cap C =$

A) $\{0, 2\}$

B) $\{0, 2, 3, 4\}$

C) $\{2\}$

D) $\{2, 3, 4\}$

E) $\{4\}$

2) Which ONE of the following statements is FALSE?

A) $(-\infty, 2) \cap [1, \infty) = \{1\}$.

B) Every irrational number has a multiplicative inverse.

C) The set $\{314.\overline{273}, \pi, \sqrt{2}\}$ contains exactly one rational number.

D) $A + (B + C) = (B + C) + A$ represents the commutative property for addition.

E) $|3 - \pi| = \pi - 3$.

3) Let $A = 0.0018$, $B = 400000$, and $C = 0.0002$. If $\frac{AB}{C}$ is written in scientific notation, then $\frac{AB}{C} =$

A) 3.6×10^6

B) 36×10^5

C) 3600000

D) 1.8×10^6

E) 18×10^5

4) If $\frac{(3x^{-2}y^{-3})^{-2}}{27xy} = \frac{x^m y^n}{3^k}$, then $n + m + k =$

A) 13

B) 6

C) 3

D) 5

E) 11

5) If $t - 3x = 3$, then $\left(\frac{125x}{5^t}\right)^{-\frac{2}{3}} =$

A) 25

B) 1

C) $\frac{1}{25}$

D) 5

E) 125

6) $x\sqrt[3]{16x^3y^4} + 4y\sqrt[3]{-128x^6y} =$

A) $-14x^2y\sqrt[3]{2y}$

B) $18x^2y\sqrt[3]{2y}$

C) $14xy\sqrt[3]{2x}$

D) $-14xy\sqrt[3]{2x}$

E) $-14x^2y\sqrt[3]{xy}$

7) One factor of $a^2 + 4b^2 + 4b - 4ab - 2a$, is

A) $a - 2b - 2$

B) $a + 2b + 2$

C) $a + 2b - 2$

D) $a - 2b + 2$

E) $a - b - 1$

8) One factor of $24 + 3(x - 1)^3$, is

A) $x^2 - 4x + 7$

B) $x^2 - 4x - 7$

C) $x^2 - 2x + 7$

D) $x^2 - 6x + 7$

E) $x^2 + x + 9$

9) The expression $(x + 2 + \sqrt{x^2 + 2})(x + 2 - \sqrt{x^2 + 2})$, is

- A) a binomial of degree 1 .
- B) a trinomial of degree 2 .
- C) a binomial of degree 2 .
- D) a trinomial of degree 4 .
- E) a binomial of degree 4 .

10) $1 - \frac{1}{1 - \frac{1}{1 - x}} =$

- A) $\frac{1}{x}$
- B) $-\frac{1}{x}$
- C) $\frac{1}{x - 1}$
- D) $\frac{1}{1 - x}$
- E) $\frac{2}{x}$

11) If $\frac{\sqrt{10}}{|2 - \sqrt{5}|} = a\sqrt{2} + b\sqrt{10}$, then $a + b =$

A) 7

B) 6

C) 8

D) 5

E) 9

12) The sum of all the solutions of the equation $\frac{x-1}{x-2} - \frac{1}{x} + 1 = \frac{2x}{x-2}$ is

A) $\frac{1}{2}$

B) $-\frac{1}{2}$

C) 1

D) -1

E) $\frac{3}{2}$

13)
$$\frac{x^2 - 2x - 15}{x^2 - 6x + 5} \div \frac{x^2 - x - 12}{x^2 - 1} - \frac{1}{x - 4} =$$

A) $\frac{x}{x - 4}$

B) $\frac{x}{x + 1}$

C) $\frac{x}{x - 1}$

D) $\frac{x + 1}{x - 5}$

E) $\frac{1}{x - 4}$

14) The length of a rectangle is 3 feet more than twice the width. If the perimeter of the rectangle is 60 feet, then the length of the rectangle is

A) 21

B) 25

C) 19

D) 17

E) 23

- 15) If the circle $x(x - 8) + y(y + 6) = 24$ has center (h, k) and radius r , then $h + k + r =$
- A) 8
- B) 14
- C) 50
- D) 0
- E) 6
- 16) A circle has radius 5 and center in the second quadrant. If the circle is tangent to the y -axis at the point $(0, 9)$, then the equation of the circle is
- A) $(x + 5)^2 + (y - 9)^2 = 25$
- B) $(x + 5)^2 + (y + 9)^2 = 25$
- C) $(x + 9)^2 + (y - 5)^2 = 25$
- D) $(x - 9)^2 + (y - 5)^2 = 25$
- E) $(x - 5)^2 + (y - 9)^2 = 25$

- 17) The domain of the expression $\frac{x^2 + 5x + 4}{(x + 4)^3 - 9x - 36}$, is
- A) $(-\infty, -7) \cup (-7, -4) \cup (-4, -1) \cup (-1, \infty)$
 - B) $(-\infty, -7) \cup (-7, \infty)$
 - C) $(-\infty, -4) \cup (-4, -1) \cup (-1, \infty)$
 - D) $(-\infty, -7) \cup (-7, -1) \cup (-1, \infty)$
 - E) $(-\infty, -7) \cup (-7, -4) \cup (-4, \infty)$
- 18) If $(-2, 11)$ is the midpoint of the line segment joining the endpoints (a, b) and $(4, -6)$, then $a + b =$
- A) 20
 - B) 16
 - C) 15
 - D) 18
 - E) 21

19) If $x < 0$, then the distance between the points $(2x, -x)$ and $(6x, 2x)$, is

A) $-5x$

B) $5x$

C) $-7x$

D) $7x$

E) $-6x$

20) The coefficient of x^2y in the expression $(x^2 - 2y)^2 - (x - y)^3$, is

A) -1

B) 2

C) -2

D) 1

E) -3