

1) Which one of the following statements is TRUE?

A)  $(1, 3) \cap [2, 7] = [2, 3)$

B) For any real number  $r$ ,  $|-r| = r$

C) The distance between  $-5$  and  $2$  is  $3$

D) The sum of two irrational numbers is always an irrational number

E)  $(x + 2y) + 3z = x + (2y + 3z)$  illustrates the commutative property

2) The number of the irrational numbers in the set

$\left\{ 3.14, \frac{\pi}{3}, \frac{0}{4}, \frac{\sqrt{8}}{\sqrt{2}}, \frac{22}{7}, \sqrt{12}, \sqrt{81}, \frac{2.1}{5.4}, 0.010010001\dots \right\}$  is:

A) 3

B) 5

C) 4

D) 2

E) 6

3)  $[2 \div (\sqrt{16} - 2) - (-8^2)] - [2 - (-1)]^2 =$

A) 56

B) 62

C) 64

D) 60

E) - 72

4) The expression  $|\sqrt{5} - \pi| + |2 - \sqrt{5}|$  simplifies to:

A)  $\pi - 2$

B)  $2 - \pi$

C)  $2\sqrt{5} - \pi - 2$

D)  $2 + \pi - 2\sqrt{5}$

E)  $\pi + 2$

5) The expression  $\frac{(3,600,000)(0.000002)}{0.000048}$  in scientific notation is equal to:

A)  $1.5 \times 10^5$

B)  $1.5 \times 10^4$

C)  $15 \times 10^5$

D)  $2 \times 10^5$

E)  $2.5 \times 10^5$

6)  $xy^2 \sqrt[3]{16x^6y^4} - 4x^2y \sqrt[3]{128x^3y^7} =$

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

B)  $-12x^3y^2 \sqrt[3]{2x^2y}$

C)  $-16x^2y^3 \sqrt[3]{2x^2y}$

D)  $-4x^2y^3 \sqrt[3]{2x^2y}$

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

7) For  $x > 0$ ,  $y > 0$ , and  $z > 0$ , the expression  $\left(\frac{x^{\frac{1}{3}}y^2z^3}{x^{\frac{7}{3}}y^4z^{-3}}\right)^2$  simplifies to:

- A)  $\frac{z^3}{xy}$
- B)  $\frac{xz^2}{y}$
- C)  $\frac{y^2}{x^2z^3}$
- D)  $\frac{z^3}{xy^2}$
- E)  $\frac{z}{x^2y}$

8) The expression  $(\sqrt[3]{2})(\sqrt[3]{32}) - 8^{\frac{2}{3}}(125^{-\frac{1}{3}})$  simplifies to:

- A)  $\frac{16}{5}$
- B)  $\frac{8}{5}$
- C)  $\frac{12}{5}$
- D) 2
- E)  $\frac{18}{5}$

9) The expression  $[3x + 5 - \sqrt{x}][3x + 5 + \sqrt{x}]$  is:

- A) a trinomial of degree 2
- B) a monomial of degree 3
- C) a binomial of degree 2
- D) a monomial of degree 1
- E) a monomial of degree 2

10) The expression  $(4x - 5y)(4x + 5y) - (2x - 3y)(3x + 2y)$  simplifies to:

- A)  $10x^2 + 5xy - 19y^2$
- B)  $10x^2 + 5xy + 19y^2$
- C)  $10x^2 - 5xy - 19y^2$
- D)  $10x^2 - 5xy + 19y^2$
- E)  $10x^2 - 19y^2$

11) The expression  $\left(x + \frac{1}{x}\right)^2 - \left(x - \frac{1}{x}\right)^2$  simplifies to:

A) 4

B)  $\frac{4}{x}$

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

D) 0

E) 8

12) The expression  $\frac{x^2 - x}{1 - \sqrt{x}}$  simplifies to:

A)  $-x(1 + \sqrt{x})$

B)  $x(1 + \sqrt{x})$

C)  $x(1 - \sqrt{x})$

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

E)  $\frac{1 + \sqrt{x}}{x}$

13) The coefficient of  $x^3y^2$  in the expansion of  $3x(x^2 - 2y)^3$  is:

- A) 36
- B) - 18
- C) 18
- D) - 24
- E) - 36

14) One of the factors of  $(2x + 3)^{\frac{3}{2}} - (2x + 3)^{\frac{1}{2}} - 2(2x + 3)^{-\frac{1}{2}}$  is:

- A)  $2x + 1$
- B)  $x - 1$
- C)  $x - 2$
- D)  $x + 1$
- E)  $2x + 5$

15) If  $(Cx + 3y)^2 = 25x^2 + Axy + By^2$ , then  $A + B + C =$

A) 44

B) 34

C) 54

D) 42

E) 52

16) One of the factors of  $9 + x^3y^2 - 9x^3 - y^2$  is:

A)  $x^2 + x + 1$

B)  $x^2 - x + 1$

C)  $y - 9$

D)  $y + 9$

E)  $y^2 + y + 3$



17)  $2 + \frac{x^2 - 9}{x^2 + 5x + 6} \div \frac{3 - x}{x + 2} =$

A) 1

B) 0

C)  $\frac{-x + 2}{x + 2}$

D)  $\frac{-3}{x - 3}$

E)  $\frac{4}{(x + 2)^2}$

18) If  $\frac{x - \frac{8}{x - 2}}{x - \frac{x + 10}{x - 2}} = \frac{x - a}{x - b}$ , then  $a + b =$

A) 9

B) 18

C) 2

D) 10

E) 12

19) The domain of the expression  $\frac{x^2 - 9}{x^2 - 3x}$  is:

A)  $(-\infty, 0) \cup (0, 3) \cup (3, \infty)$

B)  $(-\infty, \infty)$

C)  $(0, 3)$

D)  $(-\infty, 3) \cup (3, \infty)$

E)  $(-\infty, 0) \cup (0, \infty)$

20) The solution set of the equation  $\frac{3}{x+4} = \frac{1}{x} + \frac{6x+12}{x(x+4)}$  contains:

A) one negative integer only

B) no real numbers

C) one negative and one positive integer only

D) two negative integers only

E) one positive integer only