

1) If $A = \{x \mid x \text{ is a prime number} \leq 7\}$, $B = \{y \mid y \text{ is an even whole number} < 10\}$ and $C = \{0, 1, 2\}$, then the **number** of elements in the set $A \cup (B \cap C)$, is

A) 5

B) 6

C) 4

D) 3

E) 2

2) Which **one** of the following statements is **TRUE** ?

A) $(a + b) + c = (b + a) + c$ represents commutative property.

B) The distance between -3 and 1 is 2 .

C) If $x < 0$, then $|x| = x$.

D) The additive inverse of $1\frac{1}{2}$ is $-\frac{2}{3}$.

E) $\frac{22}{7}$ is an irrational number.

3) If $k < 0$, then $|\pi - 4| + |\pi - 3| + \frac{|k|}{k}$ is equal to

- A) 0
- B) -8
- C) 2
- D) $2\pi - 8$
- E) $2\pi - 6$

4) If $a = 2$ and $b = -3$, then $(85)^{3a} \left(\frac{1}{a^{-2}} - \frac{3}{b^{-3}} \right)^{2b} =$

- A) 1
- B) 0
- C) $-\frac{1}{77}$
- D) $-\frac{1}{85}$
- E) 85^{12}

5) The expression $(2^{-1} a^3 b^{-2})^2 \div 2^{-2} (a b^{-1})^{-1}$ simplifies to

- A) $a^7 b^{-5}$
- B) $a^5 b^{-3}$
- C) $2a^7 b^{-5}$
- D) $2a^5 b^{-3}$
- E) $2^{-4} a^7 b^{-5}$

6) Let $a = 93,000,000$ *miles* be the distance from the earth to the sun, and $b = 1.86 \times 10^5$ *miles per second* be the speed of light. If $c = \frac{a}{b}$ is the time, in seconds, for a light ray from the sun to reach the earth, then $c =$

- A) 5×10^2
- B) $\frac{1}{2} \times 10^2$
- C) $\frac{1}{2} \times 10^1$
- D) $\frac{1}{2} \times 10^{-1}$
- E) 5×10^{-1}

7) If the expression $\left[\frac{x^{2/3} (x^{-1/4} y^{1/6})^{-1}}{(x^{-1/2} y^2)^{-1}} \right]^2$ simplifies to $x^m y^n$, then $m + n =$

- A) $\frac{9}{2}$
- B) $\frac{13}{3}$
- C) $\frac{5}{6}$
- D) 3
- E) $\frac{16}{3}$

8) The expression $\frac{1}{1 + \sqrt{8} - \sqrt{18}}$ simplifies to

- A) $-1 - \sqrt{2}$
- B) $-1 + \sqrt{2}$
- C) $1 - \sqrt{2}$
- D) $1 + \sqrt{2} - \sqrt{3}$
- E) $-1 - \sqrt{2} + \sqrt{3}$

9) $\left(\frac{\sqrt[3]{32} - 18}{\sqrt[3]{2} - 3} \right) \div (\sqrt[3]{2} + 3) =$

A) 2

B) -3

C) $-\sqrt[3]{4}$

D) $1 - 2\sqrt[3]{2}$

E) $1 + \sqrt[3]{2}$

10) The expression $\frac{1}{\sqrt{x}\sqrt{x}}$ simplifies to

A) $\frac{\sqrt[4]{x}}{x}$

B) $\frac{\sqrt[4]{x^3}}{x}$

C) $\frac{\sqrt[3]{x^2}}{x}$

D) $\frac{\sqrt[3]{x}}{x}$

E) $\sqrt[3]{x}$

11) The **coefficient** of x in the expansion $(\sqrt{x} + \sqrt{2x - 1})(\sqrt{x} - \sqrt{2x - 1})$, is equal to

A) -1

B) 2

C) -2

D) 0

E) 4

12) If $9x^2 + 3kxy + 49y^2$ is a perfect square trinomial, then a value of k is

A) -14

B) -42

C) 42

D) 21

E) 28

13) One factors of the polynomial $(2x - 1)^3 - (x - 1)^3$ is

- A) x
- B) $x - 1$
- C) $2x - 1$
- D) $7x^2 - 9x - 3$
- E) $7x^2 + 9x - 3$

14) One of the factors of $a^2 - ab - 2b^2 + a + b$ is

- A) $a - 2b + 1$
- B) $a - 2b - 1$
- C) $a + 2b - 1$
- D) $a + 2b + 1$
- E) $a - b$

15) $\frac{2}{2 + \frac{1}{2 - \frac{1}{2}}} =$

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

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

C) $\frac{3}{8}$

D) $\frac{8}{3}$

E) 2

16) $\frac{b^2 a^{-1} + a^2 b^{-1}}{b a^{-2} + a b^{-2}} =$

A) ab

B) $\frac{1}{ab}$

C) $\frac{ab}{a + b}$

D) $a - b$

E) $a + b$

17) $\frac{2x^2 - 3x + 1}{x^2 - 3x + 9} \div \frac{x^2 + 2x - 3}{x^3 + 27} =$

A) $2x - 1$

B) $2x + 1$

C) $3x + 1$

D) $3x - 1$

E) $x + 3$

18) The **sum** of the solution(s) of the equation $3(x - 5)^{-\frac{2}{3}} = 12$, is

A) 10

B) 12

C) $\frac{41}{8}$

D) $\frac{39}{8}$

E) 8

19) If $x = 7$ is a solution of the equation $\frac{x}{5} - 0.7 = \frac{3kx}{10}$, then $k =$

A) $\frac{1}{3}$

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

C) 1

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

E) -1

20) If a is the solution of the equation $\frac{x+3}{x-1} = \frac{x-1}{x}$, then $a =$

A) $\frac{1}{5}$

B) $\frac{1}{3}$

C) $-\frac{1}{3}$

D) 5

E) -1