

Real Numbers, Absolute value, Sets

$$1) \frac{-20 \div 4 \times 5 \div 5 - 3}{-4 - (1 - 3) - 2 \times 6 \div 2} =$$

A) 1

B) -1

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

D) $\frac{1}{8}$

E) $\frac{2}{8}$

$$2) \text{ If } x - 2 = y, \text{ then } \frac{2|x - y| + |y - x|}{x - y} =$$

A) 3

B) 0

C) -3

D) 1

E) -1

3) The number of rational numbers in the set

$$A = \{0, -4, 3.14, \sqrt{3}, -2.17359, \frac{\pi}{3.14}, \sqrt{64}, \sqrt[3]{-8}, \frac{12}{6}, \frac{-7}{\sqrt{4}}\} \text{ is}$$

A) 8

B) 7

C) 6

D) 5

E) 9

4) Which one of the following statements is **FALSE** ?

A) $\sqrt{x^2 - 2xy + y^2} = x - y$, for any real numbers x and y .

B) $(y - x)^2 = (x - y)^2$, for any real numbers x and y .

C) $\frac{22}{7}$ is a rational number.

D) The multiplicative inverse of $\frac{1}{\sqrt{3}}$ is $\sqrt{3}$.

E) $\sqrt{3}x^2 + x + \frac{1}{2}$ is a polynomial of degree 2 .

5) $3\frac{1}{7} - (-2^4)(\frac{3}{8} - \frac{5}{12}) \div \frac{1}{3} - 3\frac{1}{7} =$

A) - 2

B) 2

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

D) $\frac{1}{4}$

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

6) If $x < 0$, then $|x - 1| + |-x| + 3 =$

A) $4 - 2x$

B) $2x + 2$

C) 2

D) $2x + 4$

E) $2x$

7) If $A = \{x \mid x \text{ is a whole number, } -3 < x \leq 2\}$, $B = \{-2, -1, 0, 1\}$, and $C = \{x \mid x \text{ is a natural number less than } 5\}$, then $(A \cup B) \cap C =$

A) $\{1, 2\}$

B) $\{0, 1, 2, 4\}$

C) $\{0, 1, 2, 3\}$

D) $\{0, 1, 2\}$

E) $\{-2, -1, 0, 1, 2\}$

8) Which **ONE** of the following statements is **TRUE**?

A) $4.\overline{13275}$ is a rational number.

B) If x is any real number, then $\sqrt{(-x)^2} = x$.

C) $\pi = \frac{22}{7}$

D) $-(3a - 5b)\frac{2}{15} = -\frac{2}{5}a - \frac{2}{3}b$

E) The sum of two irrational numbers is always an irrational number.

9) The **number** of rational numbers in the set

$$\left\{ -\frac{\sqrt{2}}{\sqrt{8}}, -\frac{3}{10}, -\frac{\pi}{3.14}, -\frac{1}{\sqrt{27}}, 0, \sqrt[3]{8}, 1.2, \frac{22}{7}, 1\frac{2}{3}, 4.141141114\dots \right\}, \text{ is}$$

A) 7

B) 8

C) 4

D) 5

E) 6

10) If $x < 0$, then the expression $\left| x - \frac{2}{5} \right| + \left| \frac{1}{10} - x \right|$ simplifies to

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

B) $\frac{3}{10}$

C) $-\frac{1}{2} - 2x$

D) $-\frac{3}{10}$

E) $-\frac{1}{2} + 2x$

11) If $A = \{x \mid x \text{ is an even integer between } -1 \text{ and } 7\}$ and $B = \{0, 1, 3, 4, 5, 6\}$, then $A \cap B =$

A) $\{0, 4, 6\}$

B) $\{0, 6\}$

C) $\{4, 6\}$

D) $\{1, 2, 3, 4, 5, 6\}$

E) $\{0, 1, 2, 3, 4, 5, 6\}$

12) Let $A = \{x \mid x \text{ is a natural odd number greater than } 3 \text{ and less than } 10\}$
 $B = \{y \mid y = |-x| - 1, x \text{ is a whole number } < 5\}$ 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) $\{4\}$

13) 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) $|3 - \pi| = \pi - 3$.

14) The number of rational numbers in the set

$\left\{ \frac{-7}{\sqrt{4}}, \frac{\pi}{2}, \frac{0}{3}, \sqrt{81}, \frac{22}{7}, 1.72722\dots, 3.125125125\dots, \sqrt{27} \right\}$, is

(a) 5

(b) 3

(c) 4

(d) 6

(e) 2

15) If $A = \{x \mid x \text{ is a prime number less than } 6\}$ and

$$B = \{y \mid y = 2x + |x|, x \text{ is integer such that } 0 \leq x < 3\},$$

then $A \cup B$ is:

(a) $\{0, 2, 3, 5, 6\}$

(b) $\{0, 1, 2, 3, 4, 5, 6\}$

(c) $\{0, 2, 3, 4, 5\}$

(d) $\{0, 2, 3, 4, 5, 6\}$

(e) $\{0, 1, 2, 3, 5, 6\}$

16) Which one of the following statements is **false**?

(a) $|-k| = k$

(b) If $|k-3| > -3$ then k is any real number

(c) $|2-\pi| = \pi-2$

(d) $|k|$ is a non-negative number

(e) $|k^2| = k^2$

17) If $0 < x < 1$, then $|5+x| + \left| \frac{-2x+2}{|x|+|x-2|} \right| =$

(a) 6

(b) $2x+4$

(c) 4

(d) $3x+7$

(e) $2x-6$

18) $\left[\frac{5}{9} - \frac{1}{4} \right] - \left[-\frac{5}{18} - \left(-\frac{1}{2} \right) \right] =$

(a) $1/12$

(b) $-1/12$

(c) $7/12$

(d) $-19/12$

(e) $19/12$

19) The value of the expression $-17+3[8x-4(3x-2)]$ when $x = -\frac{3}{4}$ is

(a) 16

(b) -11

(c) 22

(d) -5

(e) 13

20) If $\left(\frac{x^{3n}y^{2n}}{x^{-2n}y^{3n+1}}\right) = x^{A+B}y^{C+D}$, then $A+B+D =$

- (a) 4
- (b) 2
- (c) -4
- (d) -3
- (e) 7

21) If $2^{x-1} = y$, then $2^{3x-2} =$

- (a) $2y^3$
- (b) $4y^3$
- (c) $y^3/8$
- (d) $y^3/4$
- (e) $y^3/2$

22) If $-5 < x < -2$, then the expression $|x+5| + |x-2| + \sqrt{x^2} + \sqrt[3]{x^3}$ simplifies to

- (a) 7
- (b) $-2x-3$
- (c) $2x+3$
- (d) 3
- (e) $2x+7$

23) The number of rational numbers in the set

$\left\{\frac{-7}{\sqrt{4}}, \frac{\pi}{2}, \frac{0}{3}, \sqrt{81}, \frac{22}{7}, 1.72722\dots, 3.125125125\dots, \sqrt{27}\right\}$, is

- (f) 5
- (g) 3
- (h) 4
- (i) 6
- (j) 2

24) If $A = \{x \mid x \text{ is a prime number less than } 6\}$ and
 $B = \{y \mid y = 2x + |x|, x \text{ is integer such that } 0 \leq x < 3\}$,

then $A \cup B$ is:

- (f) $\{0, 2, 3, 5, 6\}$
- (g) $\{0, 1, 2, 3, 4, 5, 6\}$
- (h) $\{0, 2, 3, 4, 5\}$
- (i) $\{0, 2, 3, 4, 5, 6\}$
- (j) $\{0, 1, 2, 3, 5, 6\}$

25) Which one of the following statements is **false**?

- (f) $|-k| = k$
- (g) If $|k - 3| > -3$ then k is any real number
- (h) $|2 - \pi| = \pi - 2$
- (i) $|k|$ is a non-negative number
- (j) $|k^2| = k^2$

26) If $0 < x < 1$, then $|5 + x| + \left| \frac{-2x + 2}{|x| + |x - 2|} \right| =$

- (f) 6
- (g) $2x + 4$
- (h) 4
- (i) $3x + 7$
- (j) $2x - 6$

27) $\left[\frac{5}{9} - \frac{1}{4} \right] - \left[-\frac{5}{18} - \left(-\frac{1}{2} \right) \right] =$

- (f) $1/12$
- (g) $-1/12$
- (h) $7/12$
- (i) $-19/12$
- (j) $19/12$

28) The value of the expression $-17+3[8x-4(3x-2)]$ when $x=-\frac{3}{4}$ is

- (f) 16
- (g) -11
- (h) 22
- (i) -5
- (j) 13

29) If $P = \{y \mid y \text{ is an even whole number } \leq 8\}$, $Q = \{1, 3, 5, 7, 9\}$ and $R = \{0, 1, 2, 3, 4\}$. Which one of the following statements is FALSE?

- (A) $P \cap R = \{2, 4\}$
- B) $P \cup R = \{0, 1, 2, 3, 4, 6, 8\}$
- C) $Q \cap R = \{1, 3\}$
- D) $Q \cup R = \{0, 1, 2, 3, 4, 5, 7, 9\}$
- E) P and Q are disjoint sets

30) If $X = -8 + (-4)(-6) \div (10\sqrt{1.44})$ and $Y = 15 \div 5 \cdot 4 \div 6 - 8$, then $X - Y =$

- (A) 0
- B) -12
- C) 12
- D) 6
- E) -6

31) If $x < -1$, then $|-x| + |x| - |x+1| =$

- (A) $-x + 1$
- B) $-x - 1$
- C) $x + 1$
- D) $x - 1$
- E) $-3x - 1$

32) Which one of the following statements is TRUE ?

A) $(5.2)^2 - (0.2)^2 = 27$

B) $2.05 - 10.5 = -7.45$

C) $2.5 \div 0.25 = 100$

D) $2.3 + 0.132 = 2.135$

E) $\sqrt{0.81} = 9$

33) If $x < 0$ and $y > 0$, then $-|2x| - |3y| + x - y =$

A) $3x - 4y$

B) $-x - 4y$

C) $3x - 2y$

D) $3x + 4y$

E) $-3x + 4y$

34) Which one of the following statements is TRUE ?

A) The multiplication inverse of $-6\frac{3}{8}$ is $-\frac{8}{51}$

B) Every real number has a multiplication inverse.

C) $(a + b) + c = (b + a) + c$ represents associative property.

D) $-\frac{\sqrt{18}}{4\sqrt{2}}$ is an irrational number.

E) 2π is a rational number.

35) Which one of the following statements is TRUE ?

A) 3^{-4} is greater than 5^{-3} .

B) $(9)^{-2}$ is greater than 1.

C) $(0.03)^2 = 0.9$

D) $\frac{(3^3)(3^{-5})}{3^8} = 1$

E) $5^{-1} + 2^{-3} = \frac{7}{40}$

36) Which one of the following statements is FALSE ?

A) $|5 - \sqrt{26}| = 5 - \sqrt{26}$

B) $-|-9| = -9$

C) $|x - y| = |y - x|$

D) $|-3\pi| = 3\pi$

E) $|x| \cdot |-7| = |-7x|$

37) Which one of the following statements is FALSE:

A) If x is any integer and y is any irrational number, then $\frac{x}{y}$ is an irrational number.

B) If x is any positive real number, then $|x| = x$.

C) If the set $B = \left\{-6, 0, \pi, 3.14, \frac{15}{4}, \sqrt{18}\right\}$ then B has four rational numbers.

D) The distributive property states that $(x + y)z = xz + yz$.

E) If $y > 10$, then $|10 - y| = y - 10$.

38) If $A = \{2, 4, 6, 8, \dots\}$ then A can be written

A) $\{x \mid x \text{ is an even positive integer}\}$

B) $\{x \mid x \text{ is an even integer}\}$

C) $\{2x \mid x \text{ is a whole number}\}$

D) $\{2x \mid x \text{ is an integer}\}$

E) $\{2x \mid x \text{ is a rational number}\}$