P2: **Real Numbers, Absolute value, Sets**

1. $\frac{-20\div4\times5\div5-3}{-4-(1-3)-2\times6\div2}=$

A) 1

B) -1

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

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

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

2. If $x-2=y$, 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 $A =$

$\left\{0, -4, 3.14, \sqrt{3}, -2.17\overline{359}, \frac{\pi}{3.14}, \sqrt{64}, \sqrt[3]{-8}, \frac{12}{6}, \frac{-7}{\sqrt{4}}\right\}$ 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. $3\frac{1}{7} - (-2^4)\left(\frac{3}{8} - \frac{5}{12}\right) \div \frac{1}{3} - 3\frac{1}{7} =$

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

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) $4.13\overline{275}$ 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

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

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 $A = \{x \mid x$ is an even integer between -1 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 $A = \{x \mid x$ is a natural odd number greater than 3 and less than 10$\}$ $B = \{y | y = | - x | - 1, x$ is a whole number $< 5\}\}$ and $C = \{x \mid x$ 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) $\mathrm{A} + (\mathrm{B} + \mathrm{C}) = (\mathrm{B} + \mathrm{C}) + \mathrm{A}$ represents the commutative property for addition.

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

14. The number of rational numbers in the set

$\left\{\frac{-7}{\sqrt{4}}, \frac{\pi}{2}, \frac{0}{3}, \sqrt{81}, \frac{22}{7}, 1.72722\ldots, 3.125125125.., \sqrt{27}\right\}$, 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 $B = \{y | y = 2x + |x|, x$ 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 $-5 < x < -2$, 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) $2x + 7$

21. If $A = \{x \mid x \text{ is a prime number less than } 6\}$ and $B = \{y | y = 2x + |x|, x$ 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) $\{0,1,2,3,5,6\}$

22. 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

23.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

24.If $x < -1$, then $|-x| + |x| - |x+1| =$

A) $-x + 1$

B) $-x - 1$

C) $x + 1$

D) $x - 1$

E) $-3x - 1$

25. 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) $2.3 + 0.132 = 2.135$

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

A) $3x - 4y$

B) $-x - 4y$

C) $3x - 2y$

D) $3x + 4y$

E) $-3x + 4y$

27. 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.

28. 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) $5^{-1}+2^{-3}=\frac{7}{40}$

29. 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) $|x| \cdot |-7| = |-7x|$

30. 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 $|10-y| = y-10$.

31.If $A = \{2,4,6,8, \ldots\}$ then A can be written

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

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

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

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

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

32.The number of irrational numbers in the set

$$\left\{5.3, 1.234\overline{7632}, \sqrt{\frac{7}{4}}, -132, 2\frac{13}{14}, \sqrt[3]{-27}, -\frac{20}{5}, \frac{44}{14}, \frac{2\pi}{3.14}, \frac{0}{\sqrt{8}}, \frac{22}{7} - \pi\right\}$$ is

A) 4

B) 3

33. $\left[-5+\frac{19}{3}-\left(-\frac{2}{3}\right)\right] \div \left(\frac{1}{2}-\frac{1}{3}\right) \cdot (-2^2 \div 16) =$

A) 3

B) $-\frac{9}{2}$

C) -3

34. Let $A = \{-3,-1,0,1,3\}, B = \{x \mid x \text{ is a whole number such that } x < 7\}$ and $C = \{-2,0,2,4,6\}$, then $A \cap (B \cup C) =$

A) $\{0,1,3\}$

35.Let $A = \{x \mid x \text{ is a even integer}, -1 \leq x < 4\}$

$B = \{x \mid x \text{ is a negative integer greater than -5}\}$ and $C = \{-5,2,4\}$

Then $(A \cup B) \cap C =$

A) $\{2\}$

36.The number of rational numbers in the set $\left\{\frac{7\pi}{22}, (1 - \sqrt{3})^0, 3.14, \sqrt[5]{-32}, \sqrt{8}, \frac{0}{\pi}, \frac{\sqrt{3}}{\sqrt{27}}, 1.2334\overline{2}\right\}$

A) 6

38.If $-3 < x < -1$, then $\left|\frac{|-2x|-2|x-2|}{4x+4}\right|$

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

39.Which one of the following is TRUE?

A) $|-x| = -x; x < 0$

41. $\frac{9+2^2\times(-1)^5}{(6-2)^2\div 8+3}=$

A) $\frac{134}{80}$

B) $-\frac{134}{80}$

C) 1

42. The number of integers in the set $\mathrm{B}=\left\{5,\sqrt{7},-13,\frac{0}{9},\sqrt{4},0.7,-7\pi,0.\overline{4}\right\}$

A) 3

B) 4

C) 7

D) 6

E) 5

43. Given the intervals $A = (-1,5), B = (1,7]$ and $C = [2,6]$, then $(A \cap B) \cup C =$

A) $(1,5]$

B) $(-1,7]$

C) $(1,6]$

44. If $M = \{y \mid y \text{ is a real number } 0 < y \leq 2\}$ and $N = (-1,1]$, then $M \cup N =$

A) $(0,1]$

B) $(-1, \infty)$

C) $\{1,2\}$

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

E) $(-1,2]$

45.The number of irrational numbers in the set

$$\left\{-\frac{22}{7}, -\frac{\pi}{3.14}, -\frac{\sqrt{3}}{\sqrt{12}}, -\frac{1}{\sqrt{2}}, \sqrt[3]{27}, \sqrt[4]{32}, 1.5, 1\frac{2}{3}, 3.1\overline{4}\right\} \text{ is}$$

A) 4

B) 3

C) 2

D) 5

E) 6

46.If $x < 0$, then the expression $\left|x - \frac{1}{4}\right| - \left|\frac{1}{2} - x\right|$ simplifies to

A) $2x - \frac{1}{4}$

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

C) $-\frac{1}{4}$

D) $2x - \frac{3}{4}$

E) $-2x + \frac{3}{4}$

47. The property of real numbers illustrated in the statement $3y + 2(xy) = 3y + (2x)y$ is the

A) associative property of multiplication.

B) commutative property of addition.

C) associative property of addition.

D) distributive property.

E) commutative property of multiplication.