

1) 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

2) If  $M = -2^{-2} \cdot (-4)^0$  and  $N = -\frac{2}{5} \div 1.6$ , then the distance between  $M$  and  $N$  is equal to

- A) 0
- B)  $\frac{1}{4}$
- C)  $\frac{1}{2}$
- D)  $-\frac{84}{25}$
- E)  $-\frac{1}{2}$

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

4) If  $x \neq 0$ ,  $y \neq 0$ , and  $\frac{3(x^4 y^{-1})^{-1} (-2x^{-2})^{-2}}{(2^{-1} y^{-2})^2} = kx^a y^b$ , then  $k + a + b =$

A) 8

B)  $\frac{16}{3}$

C) -43

D) 0

E)  $-\frac{3}{16}$

5) The decimal notation of the expression  $\frac{(1.6 \times 10^3)(5.1 \times 10^{-5})}{4.8 \times 10^2}$ , is

- A) 0.00017
- B) 0.000017
- C) 0.0014
- D) 140000
- E) 0.0017

6) If  $z$  is a nonzero real number, then  $(4z^{-2})^{1/2} \left( \frac{8}{27z^{3/2}} \right)^{-2/3} =$

- A)  $\frac{9z}{2|z|}$
- B)  $-\frac{9}{2}$
- C)  $\frac{9}{2}$
- D)  $-\frac{3z^2}{4}$
- E)  $\frac{9z}{4|z|}$

7) If  $x > 0$  and  $y > 0$ , then  $x^2\sqrt{8xy^5} - 4y\sqrt{2x^5y^3} =$

A)  $-2x^2y^2\sqrt{2xy}$

B)  $2x^2y^2\sqrt{2xy}$

C)  $0$

D)  $x^2y^2\sqrt{2xy}$

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

8) When the denominator is rationalized,  $\frac{\sqrt{3} - \sqrt{2}}{2\sqrt{3} + 3\sqrt{2}} =$

A)  $\frac{5\sqrt{6}}{6} - 2$

B)  $\frac{5\sqrt{6}}{6} + 2$

C)  $-\frac{5\sqrt{6}}{6} - 12$

D)  $-\frac{5\sqrt{6}}{6} + 12$

E)  $-\frac{5\sqrt{6}}{6} + 2$

9) When simplified, the expression  $8x^3 - 6x^2 - 1 - (2x - 1)^3$ , is

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

10) If the coefficient of  $xy$  in the product  $(Mx + y)^2 \left( x - 1 - \frac{x}{y} \right)$  is  $-7$ ,

then  $M =$

- A) 3
- B) 9
- C)  $-\frac{7}{2}$
- D)  $\frac{7}{2}$
- E) -3

11) Which one of the following is NOT a polynomial?

- A)  $x^3 - 4x^2 + 2\sqrt{x}$
- B)  $x^3 - 3x^2 + \sqrt{5}x$
- C)  $\sqrt{3}x^4 - \sqrt{5}x^2 - 1$
- D)  $x^2 - 4^{-1}x + \sqrt{12}$
- E)  $-\frac{1}{3}$

12) If the polynomial  $27y^3 + 1$  factors into  $(3y + 1)(My^2 + Ny + 1)$ , then

$$M + N =$$

- A) 6
- B) 12
- C) 15
- D) 3
- E) 9

13) One factor of  $2t^{3/2} - 7t^{1/2} - 4t^{-1/2}$  is

- A)  $2t + 1$
- B)  $2t - 1$
- C)  $t - 2$
- D)  $t + 2$
- E)  $t + 4$

14) One factor of the polynomial  $q^2 - p^2 + 4p - 4$ , is

- A)  $(q - p + 2)$
- B)  $(q - p - 2)$
- C)  $(q + p + 1)$
- D)  $(q - p)$
- E)  $(q + p)$

15) The domain of the expression  $\frac{x+1}{x^2-x-2}$ , is

A)  $\{x \mid x \neq -1, x \neq 2\}$

B)  $\{x \mid x \neq -1, x \neq 1\}$

C)  $\{x \mid x \neq 2\}$

D)  $\{x \mid x \neq -2\}$

E)  $\{x \mid x \neq -1\}$

16)  $\left(\frac{a^2 + 2ab + b^2}{a^2 - b^2}\right) \div \left(\frac{a^2 - ab - 2b^2}{2a^2 - ab - b^2}\right) =$

A)  $\frac{2a + b}{a - 2b}$

B)  $\frac{a - 2b}{2a + b}$

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

D)  $\frac{a - b}{a + b}$

E)  $-1$



17) The expression  $\frac{x}{x^2 - 5x + 6} + \frac{1}{2 - x}$ , simplifies to

A)  $\frac{3}{(x - 2)(x - 3)}$

B)  $\frac{-3}{(x - 2)(x - 3)}$

C)  $\frac{2x - 3}{(x - 2)(x - 3)}$

D)  $\frac{2x + 3}{(x - 2)(x - 3)}$

E)  $\frac{3 - 2x}{(x - 2)(x - 3)}$

18)  $\left(\frac{a^{-2} - b^{-2}}{a^{-1} + b^{-1}}\right)^{-2} =$

A)  $\frac{a^2 b^2}{(a - b)^2}$

B)  $-\frac{a^2 b^2}{(a - b)^2}$

C)  $-(a^2 + b^2)$

D)  $\frac{1}{a^2 - b^2}$

E)  $\frac{1}{a^2 + b^2}$

19) If  $x = \frac{21}{11}$  is a solution of the equation  $\frac{N}{3}x + \frac{1}{2}(x - 3) = \frac{1}{4}(x + 1)$ , then

$N$  is equal to:

A) 2

B) 3

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

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

E) 4

20) If  $x = (5x - 2)(2y - 1)$ , then  $x =$

A)  $\frac{1 - 2y}{3 - 5y}$

B)  $\frac{1 - 2y}{3 + 5y}$

C)  $\frac{1 + 2y}{3 - 5y}$

D)  $\frac{1 + 2y}{3 + 5y}$

E)  $-\frac{1 + 2y}{3 + 5y}$