

1) Which one of the following statements is TRUE ?

- A)  $|a - b| = b - a$ , if  $0 < a < b$
- B) For all rational numbers  $a$  and  $b$ ,  $\frac{a}{b}$  is a rational number
- C)  $xy + yz = xy + zy$  represents the distributive property  
For any real numbers  $x$ ,  $y$  and  $z$
- D) The set  $\{x \mid x \text{ is a real number between } 0 \text{ and } 1\}$  is a finite set
- E)  $\{1, 3, 6, 7\} \cap \emptyset = \{1, 3, 6, 7\}$

2) The number of rational numbers in the set

$$\left\{ -4.\bar{2}, -\frac{2.3}{4.1}, \frac{22}{7}, \frac{\pi}{3}, 0, \sqrt{81}, \frac{5}{\sqrt{2}}, 3.14, 2.171171117... \right\}, \text{ is}$$

- A) 6
- B) 4
- C) 8
- D) 7
- E) 5

$$3) \frac{15 \div 5 \cdot 4 \div 6 - 7}{-7 - (-6) - 12 \div 3} =$$

A) 1

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

C) -1

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

E)  $\frac{5}{7}$

4) If  $U = \{x \mid x \text{ is a whole number } \leq 10\}$  is the universal set,  
 $A = \{1, 2, 3, 4\}$  and  
 $B = \{y \mid y \text{ is an even positive integer less than } 10\}$ , then  
 $(A \cap B') \cup (A' \cap B) =$

A)  $\{1, 3, 6, 8\}$

B)  $\{6, 8\}$

C)  $\{2\}$

D)  $\{1, 2, 3, 4, 6, 8\}$

E)  $\{5, 6, 7, 8, 9, 10\}$

5) The coefficient of  $x^2 y^2$  in the expansion of  $x(2x - y)^3$

- A) 6
- B) - 12
- C) - 6
- D) 12
- E) 8

6) One factor of  $2(3a + 5)^2 - (3a + 5) - 15$  is

- A)  $2a + 5$
- B)  $3a + 10$
- C)  $3a + 8$
- D)  $2a - 3$
- E)  $2a + 3$

7) If the expression  $27 + (x - 1)^3$  is factored into  $(x + 2)(x^2 + Mx + N)$  then  $M + N =$

- A) 8
- B) 18
- C) -8
- D) -18
- E) 0

8)  $|3 - \sqrt{10}| - |4 - \sqrt{10}|$

- A)  $2\sqrt{10} - 7$
- B) -1
- C) 1
- D)  $2\sqrt{10} - 1$
- E) 7

9) The polynomial  $(2x^2 - y^3)^2 - y^6$  is of degree

- A) 5
- B) 4
- C) 2
- D) 10
- E) 6

10) If  $\frac{5x^3 - 7x^2 + 14}{x^2 - 2} = Mx - 7 + \frac{Nx + P}{x^2 - 2}$ , then  $M + N + P =$

- A) 15
- B) 2
- C) 10
- D) -5
- E) 1

$$11) \frac{\frac{y+6}{y} + \frac{7}{y-2}}{\frac{y}{y-2} + \frac{1}{y}} =$$

A)  $\frac{y+12}{y+2}$

B)  $y+6$

C)  $6$

D)  $\frac{y+13}{2y+2}$

E)  $\frac{y^2-2}{y(y-2)}$

$$12) \frac{1}{h^2-h+1} - \frac{9}{h^3+1} + \frac{3}{h+1} =$$

A)  $\frac{3h-5}{h^2-h+1}$

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

C)  $\frac{h-5}{h+1}$

D)  $\frac{3h-5}{h+1}$

E)  $\frac{5}{h^2-h+1}$

13) The expression  $\frac{3x^2 + 15x^3}{5x^2 - 9x - 2} \div \frac{x^2 + x - 2}{3x^2 - 12}$  simplifies to

A)  $\frac{9x^2}{x - 1}$

B)  $\frac{3}{2}(x - 1)$

C)  $\frac{9x^2}{2x + 1}$

D)  $\frac{9x^2 + 1}{x + 1}$

E)  $x - 1$

14)  $\frac{yx^{-1} - xy^{-1}}{y^{-2} - x^{-2}} =$

A)  $-xy$

B)  $xy$

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

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

E)  $\frac{xy}{x - y}$

15) If  $x^{\frac{1}{4}} + x^{-\frac{3}{4}} - 2x^{-\frac{7}{4}}$  is factored completely by using the common factor  $x^{-\frac{7}{4}}$ , then one of the other factors is

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

16) If  $\left(\frac{3x^{\frac{5}{6}}}{y^{\frac{3}{4}}}\right)^2 \left(\frac{8y^3}{x^6}\right)^{\frac{2}{3}} = \frac{36y^N}{x^M}$ ,  $x, y > 0$ , then  $3M - 2N =$

- A) 6
- B) 8
- C) 4
- D)  $- \infty$
- E)  $- \infty$



17)  $a^2b \sqrt[3]{64 a^3 b^7} - ab^2 \sqrt[3]{8 a^6 b^4} =$

- A)  $2a^3b^3 \sqrt[3]{b}$
- B) 0
- C)  $- a^3b^3 \sqrt[3]{2b}$
- D)  $a^2b \sqrt[3]{b^2}$
- E)  $2a^3b^3$

18) By rationalizing the denominator,  $\frac{\sqrt{3}}{\sqrt{7} + \sqrt{3}} =$

- A)  $\frac{\sqrt{21} - 3}{4}$
- B)  $\frac{3 - \sqrt{21}}{4}$
- C)  $\frac{3 + \sqrt{21}}{10}$
- D)  $-\frac{3 + \sqrt{21}}{4}$
- E)  $\frac{\sqrt{7}}{7}$

19) The standard form of  $\left(\frac{1-2i}{2+i}\right)^{13}$  is

- A)  $-i$
- B)  $i$
- C)  $-5i$
- D)  $1$
- E)  $-1$

20) The imaginary part of the complex number  $\sqrt[3]{-8}(\sqrt{-4}\sqrt{-9} - 2i)$  is

- A)  $4$
- B)  $12$
- C)  $-4$
- D)  $2$
- E)  $-12$