ASSIGNMENT : 01

Qno.1 :- UNION SET.-

(i) A∪(B∪C)

A = {1, 3, 9, 21, 23, 17}

B = {1, 3, 9, 11, 15, 17, 21, 19, 23}

C = {1, 2, 3, 4, 5 --- 15}

Now

(B∪C) = {1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 17, 19, 21, 23}

A∪(B∪C) = {1, 2, 3, 4 --- 15, 17, 19, 21, 23}

(ii) B∪(A∩C)

(A∩C) = {1, 3, 9}

B∪(A∩C) = {1, 3, 9, 11, 15, 17, 21, 19, 23}

(iii) (A∪C)∪B

(A∪C) = {1, 2, 3 ---- 15, 21, 23, 17}

(A∪B)∪B = {1, 2, 3 --- 15, 17, 19, 21, 23}

(iv) B∩(A∪C)

(A∪C) = {1, 2, 3, ---- 15, 21, 23, 17}

B∩(A∪C) = {1, 3, 9, 11, 15, 17, 21, 23}

(v) B∩C

B∩C = {1, 3, 9, 11, 15}

Qno.8 :- Evaluate for given 'x' :-

① $8 + 4x + 5(x-3)$, for $x = 6$

Solution :-

$8 + 4x + 5(x-3)$

Here $x = 6$

$8 + 4(6) + 5(6-3)$

$= 8 + 24 + 15$

$= 47$

⑫ $7x + 8(x+7)^2 + 19$, for $x = 8$

Solution:-

$7x + 8(x+7)^2 + 19$

Put $x = 8$

$7(8) + 8(8+7)^2 + 19$

$= 56 + 8(15)^2 + 19$

$= 56 + 8(225) + 19$

$= 56 + 1800 + 19$

$= 1875$

⑬ $9(x-4)^2 - 9x + 6(x+4)$ for $x = -2$

Solution:-

$9(x-4)^2 - 9x + 6(x+4)$

Put $x = -2$

$9((-2)-4)^2 - 9(-2) + 6(-2+4)$

$= 9(-6)^2 + 18 + 6(2)$

$= 9(36) + 18 + 12$

$= 324 + 30$

$= 354$

⑭ $(x+2)^2 - (x-2)^2 + 6x$ for $x = 4/5$

Solution:-

$(x+2)^2 - (x-2)^2 + 6x$

Put $x = 4/5$

$(4/5 + 2)^2 - (4/5 - 2)^2 + 6(4/5)$

$= \left(\frac{4+10}{5}\right)^2 - \left(\frac{4-10}{5}\right)^2 + \left(\frac{24}{5}\right)$

$= \left(\frac{14}{5}\right)^2 - \left(\frac{-6}{5}\right)^2 + \left(\frac{24}{5}\right)$

$= \frac{196}{25} - \frac{36}{25} + \frac{24}{5}$

$= \frac{160 + 160}{25}$

$= \frac{320}{25}$

Qno. 9: Evaluate each expression at the given values of variables:-

(i) $2xy^2 + 3x^2y - 4xy + y - 6$

$x = 1, \quad y = 2$

Solution:-

$2xy^2 + 3x^2y - 4xy + y - 6$

Put $x = 1, \quad y = 2$

$2(1)(2)^2 + 3(1)^2(2) - 4(1)(2) + 2 - 6$

$= 2(4) + 3(2) - 4(2) - 4$

$= 8 + 6 - 8 - 4$

$= 6 - 4$

$= 2$

(ii) $xy^3 + 3xy^3 - 6x^3y^3 + 4x^2y + 6x^2$

$x = -2, \quad y = -3$

Solution:-

$xy^3 + 3xy^3 - 6x^3y^3 + 4x^2y + 6x^2$

Put $x = -2, \quad y = -3$

$-2(-3)^3 + 3(-2)(-3)^3 - 6(-2)^3(-3)^3 + 4(-2)^2(-3) + 6(-2)^2$

$= -2(-27) + 3(-2)(-27) - 6(-8)(-27) + 4(4)(-3) + 6(4)$

$= 54 + 6(-27) + 48(-27) + 16(-3) + 24$

$= 54 + 162 - 1296 - 48 + 24$

$= -1104$

iii) $4x + 3y + 5xy^2 - 5x^2y + 11$

$x = -1/2$, $y = -1$

Solution:-

$$4x + 3y + 5xy^2 - 5x^2y + 11$$

Put $x = -1/2$ and $y = -1$

$$4(-1/2) + 3(-1) + 5(-1/2)(-1)^2 - 5(-1/2)^2(-1) + 11$$

$$= -2(-1) - 3 - \frac{5}{2} + \frac{5}{4} + 11$$

$$= \frac{-8 - 12 - 10 + 5 + 44}{4}$$

$$= \frac{-30 + 49}{4}$$

$$\boxed{= \frac{19}{4}}$$

iv) $6yz + 11y - 1y^2z + z^2y + z^2y^2$

$y = -2$, $z = 1/2$

Solution:-

$$6yz + 11y - 1y^2z + z^2y + z^2y^2$$

Put $y = -2$, and $z = 1/2$

$$6(-2)(1/2) + 11(-2) - 1(-1)^2(1/2) + (1/2)^2(-2) + (1/2)^2(-2)^2$$

$$= -6 - 22 - \frac{1}{2} - 2 + 1$$

$$= -29 - \frac{1}{2}$$

$$\boxed{= -29.5}$$

Ans no. 10:- Simplify each expression:-

i) $(5 + 7x) - (7x + 5)$

Solution:-

$$(5 + 7x)(7x + 5)$$

$$= 5 + 7x - 7x - 5$$

$$\boxed{= 0}$$

(ii) $3(7x+1)-(4x+6)$

Solution:-

$$3(7x+1)-(4x+6)$$
$$= 21x+3-4x-6$$
$$= 21x-4x+3-6$$
$$\boxed{= 17x-3}$$

iii) $\sqrt{(9+4x)^2-(3+2x)^2}$

Solution:-

$$\sqrt{(9+4x)^2-(3+2x)^2}$$
$$= (9+4x)-(3+2x)^2$$
$$= 9+4x-(9-12x+4x^2)$$
$$= 9+4x-9+12x-4x^2$$
$$= -4x^2+12x+4x$$
$$\boxed{= -4x^2+16x}$$

iv) $3x-5[7(x+4)-7]$

Solution:-

$$3x-5[7(x+4)-7]$$
$$= 3x-5(7x+28-7)$$
$$= 3x-35x-140+35$$
$$\boxed{= -32x-105}$$

v) $\dfrac{2x(x-3)-3(x-3)}{x^2-9}$

Solution:-

$$\frac{2x(x-3)-3(x-3)}{x^2-9}$$
$$= \frac{(2x-3)(x-3)}{x^2-9}$$
$$= \frac{(2x-3)(x-3)}{(x-3)(x+3)}$$
$$\boxed{= \frac{2x-3}{x+3}}$$

vi) $\frac{|-6x|}{6x}$

Solution

$$\frac{|-6x|}{6x}$$

$$= \frac{+6x}{6x}$$

$$= 1$$

vii) $\frac{2.|-4x|}{16}$

Solution:-

$$\frac{2.|-4x|}{16}$$

$$= \frac{\cancel{2}^{1} \cdot \cancel{4}^{1}x}{\cancel{16}_{8}\ \cancel{4}_{2}}$$

$$= \frac{1}{2}x$$

viii) $(2x-3)^2 - (5x-3)(5x+3)$

Solution:-

$$(2x-3)^2 - (5x-3)(5x+3)$$

$$= 4x^2 - 12x + 9 - (25x^2 + 15x - 15x - 9)$$

$$= 4x^2 - 12x + 9 - 25x^2 \mp 15x + 15x + 9$$

$$= 4x^2 \mp 12x + 9 - 25x^2 + 9$$

$$= 4x^2 - 25x^2 \mp 12x + 18$$

$$= -21x^2 \mp 12x + 18$$

ix) $(\sqrt{x}+1)^2 + (x-1)^2 + (x^2-1)$

Solution:-

$$(\sqrt{x}+1)^2 + (x-1)^2 + (x^2-1)$$

$$= x + 2\sqrt{x} + 1 + x^2 + 1 - x + x^2 - 1$$

$$= 2\sqrt{x} + 1 + x^2 + x^2$$

$$= 2x^2 + 2\sqrt{x} + 1$$

(7)

x) $x^0 + 7x^2 - (1+3)^2 + 8x$

Solution

$$x^0 + 7x^2 - (1+3)^2 + 8x$$
$$= 1 + 7x^2 - (4)^2 + 8x$$
$$= 1 + 7x^2 - 16 + 8x$$
$$= 7x^2 + 8x - 16 + 1$$
$$\boxed{= 7x^2 + 8x - 15}$$

xi) $\left(\frac{5x^{-2}y^2}{z^4}\right)^{-2}$

Solution:-

$$\left(\frac{5x^{-2}y^2}{z^4}\right)^{-2}$$
$$= \left(\frac{5y^2}{x^2 z^4}\right)^{-2}$$
$$\boxed{= \frac{25y^4}{x^4 z^8}}$$

xii) $(2x^{-1} + 3x^{-2})^{-1}$

Solution:-

$$(2x^{-1} + 3x^{-2})^{-1}$$
$$= \left(\frac{1}{2x^{-1} + 3x^{-2}}\right)$$
$$= \frac{1}{2/x + 3/x^2}$$
$$\boxed{= \frac{x^2}{2x+3}}$$

(iii) $(5x^{-1} + 2y)^{-2}$

Solution:-

$$(5x^{-1} + 2y)^{-2}$$
$$= \left(\frac{1}{5x^{-1} + 2y}\right)^2 = \frac{1}{(5/x)^2 + 2(5/x)(2y) + 2y^2}$$

$$= \frac{1}{\frac{25}{x^2} + \frac{20y}{x} + 2y^2}$$

$$= \frac{x^2}{25 + 20xy + 2x^2y^2}$$

$$= \frac{x^2}{2x^2y^2 + 20xy + 25}$$

Qno.12:-

Factorize the Bionomial:-

i) $4x^2 + 7x + 3$

Solution:

$$4x^2 + 7x + 3$$
$$= 4x^2 + 4x + 3x + 3$$
$$= 4x(x+1) + 3(x+1)$$
$$= (4x+3)(x+1)$$

ii) $x^2 + 3x - 4$

Solution:-

$$x^2 + 3x - 4$$
$$= x^2 + 4x - x - 4$$
$$= x(x+4) - 1(x+4)$$
$$= (x-1)(x+4)$$

iii) $6x^2 - 7x + 2$

Solution:-

$$6x^2 - 7x + 2$$
$$= 6x^2 - 4x - 3x + 2$$
$$= 2x(3x-2) - 1(3x-2)$$
$$= (2x-1)(3x-2)$$

iv) $\sin^2\theta + 3\sin\theta - 4$

Solution:-

$$\sin^2\theta + 3\sin\theta - 4$$
$$= \sin^2\theta + 4\sin\theta - 1\sin\theta - 4$$
$$= \sin\theta(\sin\theta + 4) - 1(\sin\theta + 4)$$
$$= (\sin\theta - 1)(\sin\theta + 4)$$

v) $x^2 + 13x - 168$

Solution:-

$$x^2 + 13x - 168$$
$$= x^2 + 21x - 8x - 168$$
$$= x(x + 21) - 8(x + 21)$$
$$= (x - 8)(x + 21)$$

vi) $x^2 - 9x + 10$

Solution:-

$$x^2 - 9x + 10$$
$$= x^2 - 10x + x - 10$$
$$= x(x - 10) + 1(x - 10)$$
$$= (x + 1)(x - 10)$$

Q no. 7:- Properties Of Real Numbers:-

① Commulative Property of addition:
eg. $1 + 5 = 5 + 1 = 6$

② Commulative Property of multiplication:
eg:- $1 \times 5 = 5 \times 1 = 5$

③ Associative Property of addition:
eg:- $4 + (3 + 2) = 3 + (4 + 2) = 9$

④ Associative Property of Mutiplication:
eg:- $4 \times (3 \times 2) = 3 \times (4 \times 2) = 24$

⑤ Distributive Property:-
eg $3(9 + 4) = 3(9) + 3(4) = 27 + 12$
$= 39$