

5-8-2024

Unit 3

Ex: 3.3

$P = y - xC$

$P = y - (2)C$

$A = 2x - yC$

$x = 2 - yC$

Q1.

i) $(a, -b) = (7, 1)$

$a = 7$	$-b = 1$
	$-1 = b$ Ans.

ii) $(x+2y, y-3) = (2, 5)$

$x+2y=2$	$y-3=5$
$x+2(8)=2$	$y=5+3$
$x+16=2$	$y=8$
$x=2-16$	
$x=-14$	

iii) $(2a, 2b+3) = (-10, -b)$

$2a = -10$	$2b+3 = -b$
$2a = -10$	$2b+b = -3$
2	$3b = -3$
2	$b = -1$ Ans.
$a = -5$	

iv) $(2x-y, y-3x) = (4, 2)$

$2x-y = 4$ (i)	$y-3x = 2$ (ii)
	$-3x+y = 2$ (ii)

put eq(i) and (ii)

$2x-y = 4$
$3x+y = 2$
$-x = 6$ eq (iii)
$6 = x = \text{eq (iii)}$

v) $(2a-4, 6) = (8, -b+1)$

$2a-4=8$	$-b+1=6$
$2a=8+4$	$-6+1=-b$
$2a=12$	$-5=-b$ Ans
$a=6$	

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i) $(a, -b) = (7, 1)$

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ii) $(x+2y, y-3) = (2, 5)$

$x+2y = 2$	$y-3 = 5$
$x+2(8) = 2$	$y = 5+3$
$x+16 = 2$	$y = 8$
$x = 2-16$	
$x = -14$	

iii) $(2a, 2b+3) = (-10, -b)$

$2a = -10$	$2b+3 = -b$
$a = -5$	$2b+b = -3$
	$3b = -3$
	$b = -1$ Ans.

iv) $(2x-y, y-3x) = (4, 2)$

$2x-y = 4$ (i)	$y-3x = 2$ (ii)
	$-3x+y = 2$ (ii)

put eq (i) and (ii)

v) $(2a-4, b) = (8, -b+1)$

$2a-4 = 8$	$b = -b+1$
$2a = 8+4$	$-b+1 = -b$
$2a = 12$	$1 = 0$ Ans.

$2x-y = 4$
$-3x+y = 2$
$-x = 6$ eq (iii)
$6 = x = \text{eq (iii)}$

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a = 6

putting eq (ii) in (i)

$$2x - y = 4$$

$$2(6) - y = 4$$

$$-12 - y = 4$$

$$-y = 4 + 12$$

$$-y = 16 = 16 = y$$

vi) $(4x + 6y, x - 12y) = (6, -3)$

$$4x + 6y = 6 \text{ --- eq (i)} \quad x - 12y = -3 \text{ --- eq (ii)}$$

Mul 2 with eq (i)

$$2(4x + 6y = 6)$$

$$8x + 12y = 12 \text{ eq (iii)}$$

put eq (ii) in (iii)

$$8x + 12y = 12$$

$$x - 12y = -3$$

$$x = \frac{9}{9}$$

$$x = 1$$

$$x - 12y = -3$$

$$1 - 12y = -3$$

$$-12y = -3 - 1$$

$$-12y = -4$$

$$12y = 4$$

$$y = \frac{4}{12}$$

$$y = \frac{1}{3}$$

$$y = 3 \text{ Ans}$$

$$\text{vii)} \quad (5x+y, -x+y) = (6, 1)$$

$$= 5x+y=6 \text{ (i)} \quad -x+y=1 = \text{eq (ii)}$$

$$= 5x+y=6$$

$$\frac{-x+y=1}{+ \quad -}$$

$$= 6x=5$$

$$= \frac{6x}{6} = \frac{5}{6}$$

$$= x = \frac{5}{6}$$

putting x in eq (ii)

$$-x+y=1$$

$$\frac{-5}{6} + y = 1$$

$$y = \frac{1+5}{1 \quad 6}$$

$$y = \frac{6+5}{6} = \frac{11}{6}$$

$$y = \frac{11}{6} \text{ Ans.}$$

Q2 Let $A = \{1, 4, 8\}$ and $B = \{1, 0\}$ Find

i) $A \times B$

$$A = \{1, 4, 8\} \quad B = \{1, 0\}$$

$$A \times B = \{(1, 1), (4, 1), (8, 1), (1, 0), (4, 0), (8, 0)\}$$

$$A \times B = 2 \times 3 = 6 \text{ elements}$$

ii) $B \times A$

$$B = \{1, 0\} \quad A = \{1, 4, 8\}$$

$$B \times A = \{(0, 1), (0, 4), (0, 8), (1, 1), (1, 4), (1, 8)\}$$

$$B \times A = 2 \times 3 = 6 \text{ elements}$$

iii) $A \times A$

$$A = \{1, 4, 8\} \quad A = \{1, 4, 8\}$$

$$A \times A = \{(1, 1), (4, 1), (8, 1), (1, 4), (4, 4), (8, 4), (1, 8), (4, 8), (8, 8)\}$$

$$A \times A = 3 \times 3 = 9 \text{ elements}$$

iv) $B \times B$

$$B = \{1, 0\} \quad B = \{1, 0\}$$

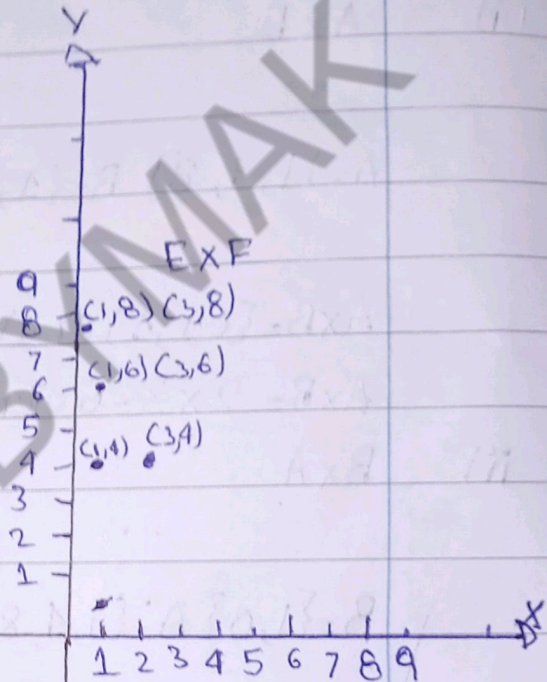
$$B \times B = \{(1, 1), (1, 0), (0, 1), (0, 0)\} \quad B \times B = 2 \times 2 = 4 \text{ elements}$$

Q3 Let $E = \{1, 3\}$ $F = \{4, 6, 8\}$ Express.

i) $E \times F$

$$E = \{1, 3\} \quad F = \{4, 6, 8\}$$

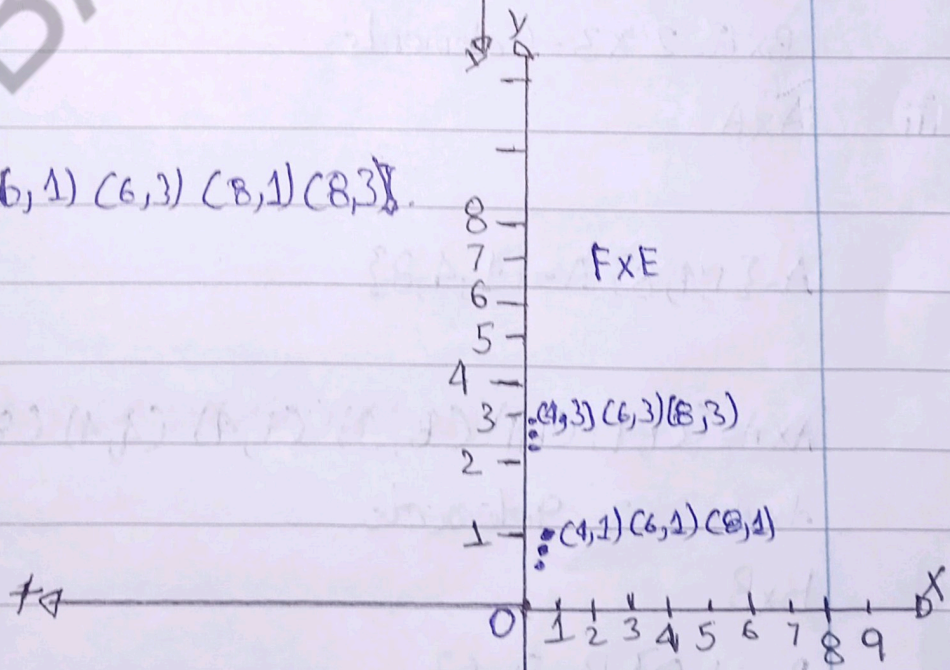
$$E \times F = \{(1, 4), (1, 6), (1, 8), (3, 4), (3, 6), (3, 8)\}$$



ii) $F \times E$

$$F = \{4, 6, 8\} \quad E = \{1, 3\}$$

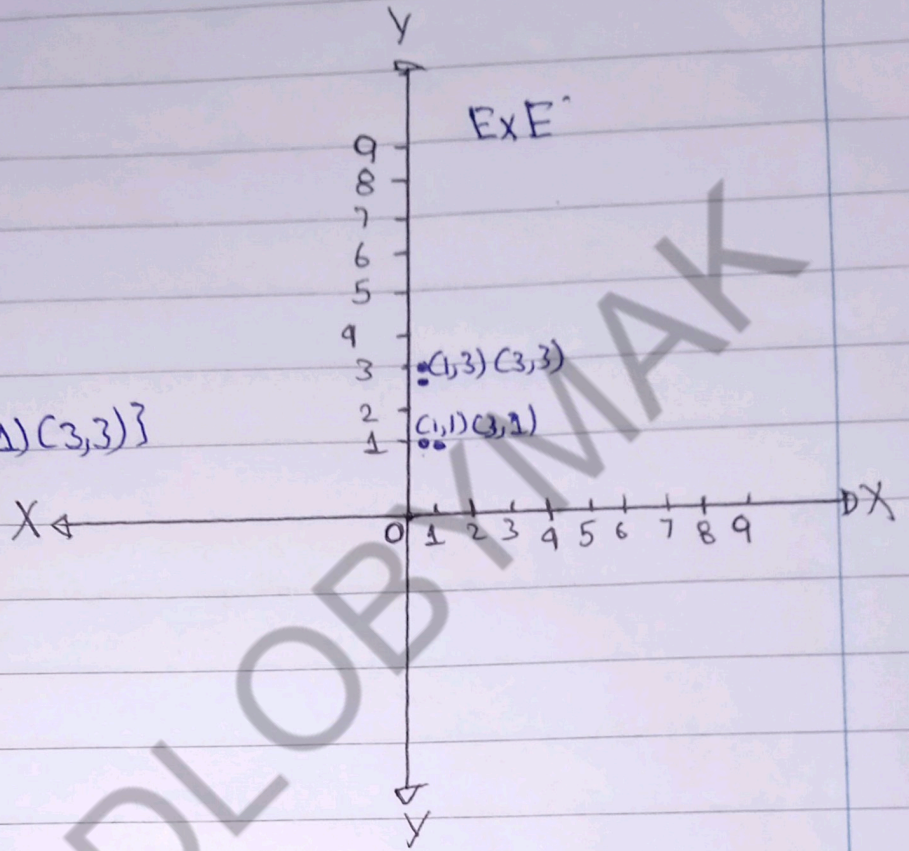
$$F \times E = \{(4, 1), (4, 3), (6, 1), (6, 3), (8, 1), (8, 3)\}$$



iii) $E \times E$

$$E = \{1, 3\} = E = \{1, 3\}$$

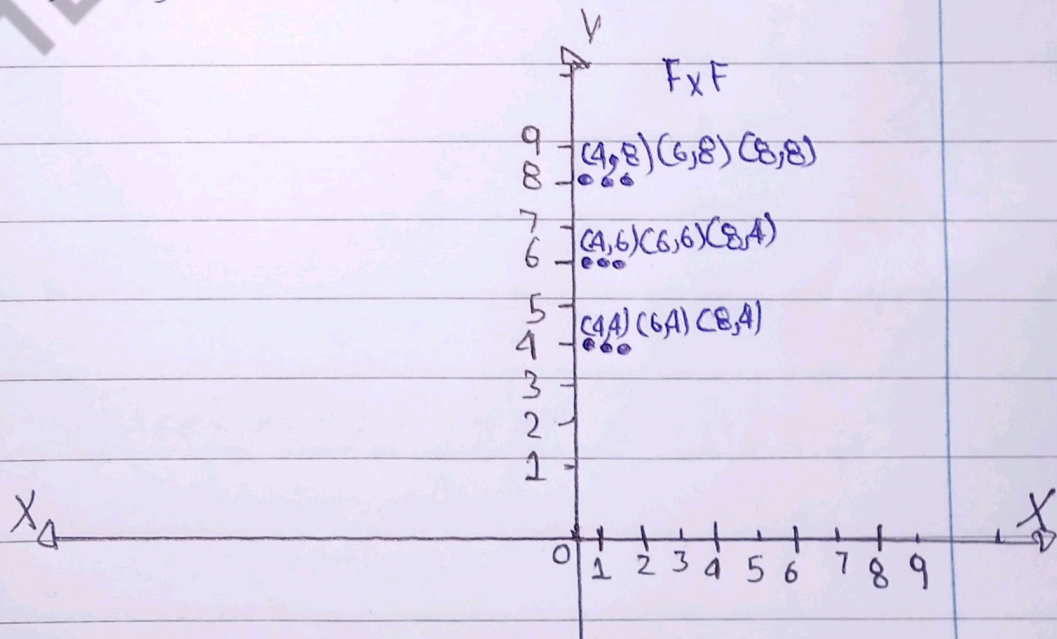
$$E \times E = \{(1, 1), (1, 3), (3, 1), (3, 3)\}$$



iv) $F \times F$

$$F = \{4, 6, 8\} = F = \{4, 6, 8\}$$

$$F \times F = \{(4, 4), (4, 6), (4, 8), (6, 4), (6, 6), (6, 8), (8, 4), (8, 6), (8, 8)\}$$



Q4 Let $L \times M = \{(0,2) (0,3) (0,4) (1,2) (1,3) (1,4)\}$ find L , M and $L \times M$

i) L, M

$$L \times M = \{(0,2) (0,3) (0,4) (1,2) (1,3) (1,4)\}$$

$$L = \{0, 1\} \quad M = \{2, 3, 4\} \text{ Ans.}$$

ii) $M \times L$

$$M = \{2, 3, 4\} \quad L = \{0, 1\}$$

$$M \times L = \{(2,0) (2,1) (3,0) (3,1) (4,0) (4,1)\} \text{ Ans.}$$

Q5 Given that $A = \{1, 3, 5\}$ $B = \{2, 4\}$ $C = \{6, 7\}$ Find

i) $A \times (B \cup C)$

$$B = \{2, 4\} \quad C = \{6, 7\}$$

$$B \cup C = \{2, 4, 6, 7\}$$

$$A \times (B \cup C) = \{1, 3, 5\} \times \{2, 4, 6, 7\}$$

$$A \times (B \cup C) = \{(1,2) (1,4) (1,6) (1,7) (3,2) (3,4) (3,6) (3,7) (5,2) (5,4) (5,6) (5,7)\} \text{ Ans.}$$

$$(ii) (AXB) \cup (AXC)$$

$$A = \{1, 3, 5\} \quad B = \{2, 4\}$$

$$AXB = \{(1, 2), (1, 4), (3, 2), (3, 4), (5, 2), (5, 4)\}$$

$$A = \{1, 3, 5\} \quad C = \{6, 7\}$$

$$AXC = \{(1, 6), (1, 7), (3, 6), (3, 7), (5, 6), (5, 7)\}$$

$$AXB = \{(1, 2), (1, 4), (3, 2), (3, 4), (5, 2), (5, 4)\} \quad AXC = \{(1, 6), (1, 7), (3, 6), (3, 7), (5, 6), (5, 7)\}$$

$$AXB \cup AXC = \{(1, 2), (1, 4), (1, 6), (1, 7), (3, 2), (3, 4), (3, 6), (3, 7), (5, 2), (5, 4), (5, 6), (5, 7)\} \text{ Ans.}$$

$$(ii) A \times (B \cup C) = (A \times B) \cup (A \times C)$$

L. H. S

$$A = \{1, 3, 5\} \quad B = \{2, 4\} \quad C = \{6, 7\}$$

$$B \cup C = \{2, 4, 6, 7\}$$

$$A \times (B \cup C) = \{1, 3, 5\} \times \{2, 4, 6, 7\}$$

$$A \times (B \cup C) = \{(1, 2), (1, 4), (1, 6), (1, 7), (3, 2), (3, 4), (3, 6), (3, 7), (5, 2), (5, 4), (5, 6), (5, 7)\}$$

R.H.S

$$(A \times B) \cup (A \times C)$$

$$A = \{1, 3, 5\} \quad B = \{2, 4\}$$

$$A \times B = \{(1, 2), (1, 4), (3, 2), (3, 4), (5, 2), (5, 4)\}$$

$$A = \{1, 3, 5\} \quad C = \{6, 7\}$$

$$A \times C = \{(1, 6), (1, 7), (3, 6), (3, 7), (5, 6), (5, 7)\}$$

$$A \times B = \{(1, 2), (1, 4), (3, 2), (3, 4), (5, 2), (5, 4)\} \quad A \times C = \{(1, 6), (1, 7), (3, 6), (3, 7), (5, 6), (5, 7)\}$$

$$(A \times B) \cup (A \times C) = \{(1, 2), (1, 4), (1, 6), (1, 7), (3, 2), (3, 4), (3, 6), (3, 7), (5, 2), (5, 4), (5, 6), (5, 7)\} \quad \text{Ans.}$$

$$L.H.S = R.H.S$$

Q6 Let $D = \{a, e, i\}$ $E = \{a, c\}$ $F = \{b, c\}$ Find

i) $D \times (E \cap F)$

$$E = \{a, c\} \quad F = \{b, c\}$$

$$E \cap F = \{c\}$$

$$D = \{a, e, i\} \quad E \cap F = \{c\}$$

$$D \times (E \cap F) = \{(a, c), (e, c), (i, c)\} \text{ Ans}$$

ii) $(D \times E) \cap (D \times F)$

$$D = \{a, e, i\} \quad E = \{a, c\}$$

$$D \times E = \{(a, a), (a, c), (e, a), (e, c), (i, a), (i, c)\}$$

$$D = \{a, e, i\} \quad F = \{b, c\}$$

$$D \times F = \{(a, b), (a, c), (e, b), (e, c), (i, b), (i, c)\}$$

$$D \times E = \{(a, a), (a, c), (e, a), (e, c), (i, a), (i, c)\} \quad D \times F = \{(a, b), (a, c), (e, b), (e, c), (i, b), (i, c)\} \star$$

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$D \times F = \{(a, d) (e, d) (i, e)\}$ Ans.

ii) $D \times (E \cap F) = (D \times E) \cap (D \times F)$

H.S.

$E = \{a, c\}$ $F = \{b, c\}$

$E \cap F = \{c\}$

$D = \{a, e, i\}$ $E \cap F = \{c\}$

$D \times (E \cap F) = \{(a, c) (e, c) (i, c)\}$

R.H.S

$D = \{a, e, i\}$ $E = \{a, c\}$

$D \times E = \{(a, a) (a, c) (e, a) (e, c) (i, a) (i, c)\}$

$D = \{a, e, i\}$ $F = \{b, c\}$

$D \times F = \{(a, b) (a, c) (e, b) (e, c) (i, b) (i, c)\}$

$D \times E = \{(a, a) (a, c) (e, a) (e, c) (i, a) (i, c)\}$ $D \times F = \{(a, b) (a, c) (e, b) (e, c) (i, b) (i, c)\}$

$(D \times E) \cap (D \times F) = \{(a, c) (e, c) (i, c)\}$

L.H.S = R.H.S

Q7 Given that $A = \{x | x \in \mathbb{N}, x < 3\}$ $B = \{y | y \in \mathbb{W}, y < 2\}$ $C = \{0, 2, 4\}$
 $A = \{1, 2\}$ $B = \{0, 1\}$ $C = \{0, 2, 4\}$

i) $A \times (B - C) = (A \times B) - (A \times C)$

L.H.S

$B = \{0, 1\}$ $C = \{0, 2, 4\}$

$B - C = \{1\}$

$A = \{1, 2\}$ $B - C = \{1\}$

$A \times (B - C) = \{(1, 1), (2, 1)\}$

R.H.S

$(A \times B) - (A \times C)$

$A = \{1, 2\}$ $B = \{0, 1\}$

$A \times B = \{(1, 0), (1, 1), (2, 0), (2, 1)\}$

$A = \{1, 2\}$ $C = \{0, 2, 4\}$

$A \times C = \{(1, 0), (1, 2), (1, 4), (2, 0), (2, 2), (2, 4)\}$

$A \times B = \{(1, 0), (1, 1), (2, 0), (2, 1)\}$ $A \times C = \{(1, 0), (1, 2), (1, 4), (2, 0), (2, 2), (2, 4)\}$

$(A \times B) - (A \times C) = \{(1, 1), (2, 1)\}$ Ans

L.H.S = R.H.S

ii) $(A - B) \times C = (A \times C) - (B \times C)$

$A = \{1, 2\}$ $B = \{0, 1\}$

~~$A = \{2\}$ $A - B = \{1, 2\}$~~

$(A - B) \times C = \{(2, 0), (2, 2), (2, 4)\}$ $\{C = \{0, 2, 4\}$

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$(A - B) \times C = \{(2, 0), (2, 2), (2, 4)\}$ $\{C = \{0, 2, 4\}$

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R.H.S

$(AXC) - (BXC)$

$A = \{1, 2\} \quad C = \{0, 2, 4\}$

$AXC = \{(1,0), (1,2), (1,4), (2,0), (2,2), (2,4)\}$

$B = \{0, 2, 4} \quad B = \{0, 1\} \quad C = \{0, 2, 4\}$

$BXC = \{(0,0), (0,2), (0,4), (1,0), (1,2), (1,4)\}$

$(AXC) = \{(1,0), (1,2), (1,4), (2,0), (2,2), (2,4)\} \quad BXC = \{(0,0), (0,2), (0,4), (1,0), (1,2), (1,4)\}$

$(AXC) - (BXC) = \{(1,0), (1,2), (1,4)\}$ Ans.

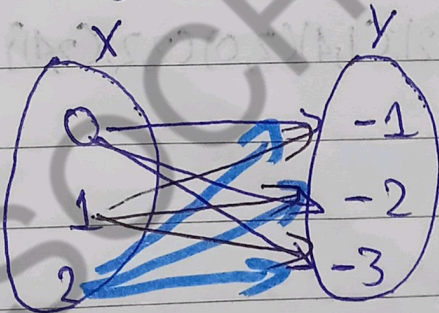
L.H.S = R.H.S.

Q8 Let $X = \{x | x \in \mathbb{W}, x < 2\}$ and $Y = \{-1, -2, -3\} = X = \{0, 1, 2\}$

i) $X \times Y$

$X = \{0, 1, 2\} \quad Y = \{-1, -2, -3\}$

$X \times Y = \{(0, -1), (0, -2), (0, -3), (1, -1), (1, -2), (1, -3), (2, -1), (2, -2), (2, -3)\}$



ii) $Y \times X$

$Y = \{-1, -2, -3\} \quad X = \{0, 1, 2\}$

$Y \times X = \{(-1, 0), (-1, 1), (-1, 2), (-2, 0), (-2, 1), (-2, 2), (-3, 0), (-3, 1), (-3, 2)\}$

