Class 11 Solutions Chapter 2 Relations Ex 2.2 Q1

We have,

$$A = \{1,2,3\},\ B = \{3,4\} \text{ and } C = \{4,5,6\}$$

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

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

and, $$B \times C = \{3,4\} \times \{4,5,6\}$$

$$= \{(3,4),\ (3,5),\ (3,6),\ (4,4),\ (4,5),\ (4,6)\}$$

$$\therefore\quad (A \times B) \cap (B \times C) = \{3,4\}.$$

Class 11 Solutions Chapter 2 Relations Ex 2.2 Q2

We have,

$$A = \{2,3\},\ B = \{4,5\} \text{ and } C = \{5,6\}$$

$$\therefore\quad B \cup C = \{4,5\} \cup \{5,6\}$$

$$= \{4,5,6\}$$

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

$$= \{(2,4),\ (2,5),\ (2,6),\ (3,4),\ (3,5),\ (3,6)\}$$

Now,

$$B \cap C = \{4,5\} \cap \{5,6\} = \{5\}$$

$$\therefore\quad A \times (B \cap C) = \{2,3\} \times \{5\}$$

$$= \{(2,5),\ (3,5)\}$$

Now,

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

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

and, $$A \times C = \{2,3\} \times \{5,6\}$$

$$= \{(2,5),\ (2,6),\ (3,5),\ (3,6)\}$$

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

Class 11 Solutions Chapter 2 Relations Ex 2.2 Q3

We have,

$$A = \{1,2,3\},\ B = \{4\} \text{ and } C = \{5\}$$

$$\therefore\quad B \cup C = \{4\} \cup \{5\} = \{4,5\}$$

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

$$\Rightarrow\quad A \times (B \cup C) = \{(1,4),\ (1,5),\ (2,4),\ (2,5),\ (3,4),\ (3,5)\} \qquad \text{---(i)}$$

Now,

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

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

and, $$A \times C = \{1,2,3\} \times \{5\}$$

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

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

$$\Rightarrow\quad (A \times B) \cup (A \times C) = \{(1,4),\ (1,5),\ (2,4),\ (2,5),\ (3,4),\ (3,5)\} \qquad \text{---(ii)}$$

From equation(i) and(ii), we get

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

Hence verified.

We have,

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

$\therefore \quad B \cap C = \{4\} \cap \{5\} = \phi$

$\therefore \quad A \times (B \cap C) = \{1,2,3\} \times \phi$

$\Rightarrow \quad A \times (B \cap C) = \phi$ ---(i)

Now,

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

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

and, $A \times C = \{1,2,3\} \times \{5\}$

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

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

$\Rightarrow \quad (A \times B) \cap (A \times C) = \phi$ ---(ii)

From equation(i) and equation(ii), we get

$A \times (B \cap C) = (A \times B) \cap (A \times C)$

Hence verified.

We have,

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

$\therefore \quad B - C = \{4\}$

$\therefore \quad A \times (B - C) = \{1,2,3\} \times \{4\}$

$\Rightarrow \quad A \times (B - C) = \{(1,4), (2,4), (3,4)\}$ ---(i)

Now,

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

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

and, $A \times C = \{1,2,3\} \times \{5\}$

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

$\therefore \quad (A \times B) - (A \times C) = \{(1,4), (2,4), (3,4)\}$ ---(ii)

From equation(i) and equation(ii), we get

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

Hence verified.

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