



Class 11 Solutions Chapter 2 Relations Ex 2.2 Q1

We have,

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

$$\begin{aligned} \therefore A \times B &= \{1, 2, 3\} \times \{3, 4\} \\ &= \{(1, 3), (1, 4), (2, 3), (2, 4), (3, 3), (3, 4)\} \end{aligned}$$

$$\begin{aligned} \text{and, } B \times C &= \{3, 4\} \times \{4, 5, 6\} \\ &= \{(3, 4), (3, 5), (3, 6), (4, 4), (4, 5), (4, 6)\} \end{aligned}$$

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

Class 11 Solutions Chapter 2 Relations Ex 2.2 Q2

We have,

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

$$\begin{aligned} \therefore B \cup C &= \{4, 5\} \cup \{5, 6\} \\ &= \{4, 5, 6\} \end{aligned}$$

$$\begin{aligned} \therefore A \times (B \cup C) &= \{2, 3\} \times \{4, 5, 6\} \\ &= \{(2, 4), (2, 5), (2, 6), (3, 4), (3, 5), (3, 6)\} \end{aligned}$$

Now,

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

$$\begin{aligned} \therefore A \times (B \cap C) &= \{2, 3\} \times \{5\} \\ &= \{(2, 5), (3, 5)\} \end{aligned}$$

Now,

$$\begin{aligned} A \times B &= \{2, 3\} \times \{4, 5\} \\ &= \{(2, 4), (2, 5), (3, 4), (3, 5)\} \end{aligned}$$

$$\begin{aligned} \text{and, } A \times C &= \{2, 3\} \times \{5, 6\} \\ &= \{(2, 5), (2, 6), (3, 5), (3, 6)\} \end{aligned}$$

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

Class 11 Solutions Chapter 2 Relations Ex 2.2 Q3

We have,

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

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

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

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

Now,

$$\begin{aligned} A \times B &= \{1, 2, 3\} \times \{4\} \\ &= \{(1, 4), (2, 4), (3, 4)\} \end{aligned}$$

$$\begin{aligned} \text{and, } A \times C &= \{1, 2, 3\} \times \{5\} \\ &= \{(1, 5), (2, 5), (3, 5)\} \end{aligned}$$

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

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

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

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

Hence verified.

We have,

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

$$\therefore B \cap C = \{4\} \cap \{5\} = \emptyset$$

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

$$\Rightarrow A \times (B \cap C) = \emptyset \quad \text{--- (i)}$$

Now,

$$\begin{aligned} A \times B &= \{1, 2, 3\} \times \{4\} \\ &= \{(1, 4), (2, 4), (3, 4)\} \end{aligned}$$

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

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

$$\Rightarrow (A \times B) \cap (A \times C) = \emptyset \quad \text{--- (ii)}$$

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

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

Hence verified.

We have,

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

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

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

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

Now,

$$\begin{aligned} A \times B &= \{1, 2, 3\} \times \{4\} \\ &= \{(1, 4), (2, 4), (3, 4)\} \end{aligned}$$

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

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

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

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

Hence verified.

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