



Sets Ex 1.6 Q2(iv)

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

$$B \cup C = \{2, 3, 4, 5, 6, 7\}$$

$$A - (B \cup C) = \{1\} \dots \dots \dots (1)$$

$$(A - B) = \{1, 4\}$$

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

$$(A - B) \cap (A - C) = \{1\} \dots \dots \dots (2)$$

From eqⁿ (1) and eqⁿ (2), we get

$$A - (B \cup C) = (A - B) \cap (A - C)$$

Sets Ex 1.6 Q2(v)

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

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

$$A - (B \cap C) = \{1, 2, 4\} \dots \dots \dots (1)$$

$$(A - B) = \{1, 4\}$$

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

$$(A - B) \cup (A - C) = \{1, 2, 4\} \dots \dots \dots (2)$$

From eqⁿ (1) and eqⁿ (2), we get

$$A - (B \cap C) = (A - B) \cup (A - C)$$

Sets Ex 1.6 Q2(vi)

$$\begin{aligned}\text{vi. } A &= \{1, 2, 4, 5\}, B = \{2, 3, 5, 6\}, C = \{4, 5, 6, 7\} \\ B \Delta C &= (B - C) \cup (C - B) = \{2, 3\} \cup \{4, 7\} = \{2, 3, 4, 7\} \\ A \cap (B \Delta C) &= \{2, 4\} \dots \dots \dots (1)\end{aligned}$$

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

$$\begin{aligned}(A \cap B) \Delta (A \cap C) &= [(A \cap B) - (A \cap C)] \cup [(A \cap C) - (A \cap B)] \\ (A \cap B) \Delta (A \cap C) &= \{2\} \cup \{4\} = \{2, 4\} \dots \dots \dots (2)\end{aligned}$$

From eqⁿ (1) and eqⁿ (2), we get

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

Sets Ex 1.6 Q3(i)

$$\begin{aligned}U &= \{2, 3, 5, 7, 9\} \text{ is the universal set} \\ A &= \{3, 7\}, B = \{2, 5, 7, 9\} \\ A \cup B &= \{x : x \in A \text{ or } x \in B\} \\ &= \{2, 3, 5, 7, 9\}\end{aligned}$$

$$\begin{aligned}\text{LHS} &= (A \cup B)'\end{aligned}$$

$$\begin{aligned}&= \{2, 3, 5, 7, 9\}' \\ &= U - A \cup B \\ &= \emptyset\end{aligned}$$

$$\begin{aligned}\text{RHS} &= A' \cap B' \\ A' &= \{x \in U : x \notin A\} \\ &= \{2, 5, 9\} \\ B' &= \{x \in U : x \notin B\} \\ &= \{3\}\end{aligned}$$

$$\begin{aligned}\therefore A' \cap B' &= \{2, 5, 9\} \cap \{3\} \\ &= \emptyset\end{aligned}$$

[\therefore the two sets are disjoint]

\therefore LHS = RHS Proved

Sets Ex 1.6 Q3(ii)

$$\text{LHS} = (A \cap B)'$$

Now,

$$\begin{aligned}A \cap B &= \{x \mid x \in A \text{ and } x \in B\} \\ &= \{7\}\end{aligned}$$

$$\begin{aligned}\therefore (A \cap B)' &= \{7\}' \\ &= \{x \in U : x \notin 7\} \\ &= \{2, 3, 5, 9\}\end{aligned}$$

$$\text{RHS} = A' \cup B'$$

$$\text{Now, } A' = \{2, 5, 9\} \quad \quad \quad [\text{from (i)}]$$

$$\text{and } B' = \{3\} \quad \quad \quad [\text{from (i)}]$$

$$\therefore A' \cup B' = \{2, 3, 5, 9\}$$

Hence, LHS = RHS Proved

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