

ISC Class 11 Maths Mock Sample Question Paper 1 with Solutions

SECTION - A

Question 1

(i) If $U = \{2, 3, 5, 7, 9\}$ is the universal set and $A = \{3, 7\}$, $B = \{2, 5, 7, 9\}$, then prove that:

[10x2]

(a) $(A \cup B)^c = A^c \cap B^c$

(b) $(A \cap B)^c = A^c \cup B^c$

Solution:

Given,

$$U = \{2, 3, 5, 7, 9\}$$

$$A = \{3, 7\}$$

$$B = \{2, 5, 7, 9\}$$

(a) $A \cup B = \{3, 7\} \cup \{2, 5, 7, 9\} = \{2, 3, 5, 7, 9\}$

$$(A \cup B)^c = U - (A \cup B)$$

$$= \{2, 3, 5, 7, 9\} - \{2, 3, 5, 7, 9\}$$

$$= \Phi$$

$$A^c = U - A$$

$$= \{2, 3, 5, 7, 9\} - \{3, 7\}$$

$$= \{2, 5, 9\}$$

$$B^c = U - B$$

$$= \{2, 3, 5, 7, 9\} - \{2, 5, 7, 9\}$$

$$= \{3\}$$

$$A^c \cap B^c = \{2, 5, 9\} \cap \{3\} = \Phi$$

Therefore, $(A \cup B)^c = A^c \cap B^c$

(b) $A^c \cup B^c = \{2, 5, 9\} \cup \{3\} = \{2, 3, 5, 9\}$

$$(A \cap B) = \{3, 7\} \cap \{2, 5, 7, 9\} = \{7\}$$

$$(A \cap B)^c = U - (A \cap B)$$

$$= \{2, 3, 5, 7, 9\} - \{7\}$$

$$= \{2, 3, 5, 9\}$$

Therefore, $(A \cap B)^c = A^c \cup B^c$

(ii) If $A = \{x \in \mathbb{N} : x \leq 3\}$ and $B = \{x \in \mathbb{W} : x < 2\}$, find $(A \times B)$ and $(B \times A)$. Check whether $(A \times B) = (B \times A)$?

Solution:

Given,

$$A = \{x \in \mathbb{N} : x \leq 3\} \text{ and } B = \{x \in \mathbb{W} : x < 2\}$$

$$A = \{1, 2, 3\}$$

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

$$A \times B = \{1, 2, 3\} \times \{0, 1\}$$

$$= \{(1, 0), (1, 1), (2, 0), (2, 1), (3, 0), (3, 1)\}$$

$$B \times A = \{0, 1\} \times \{1, 2, 3\}$$

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