Assignment

1. If $A = \{1, 2\}$, $B = \{1, 2, 3, 4\}$, $C = \{4, 6\}$

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

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

$A = \{1, 2\}$

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

$C = \{4, 6\}$

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

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

$= \{(1,1), (1,2), (1,3), (1,4), (1,6), (2,1), (2,2),$

$\qquad (2,3), (2,4), (2,6)\} \longrightarrow ①$

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

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

$A \times C = \{(1,4), (1,6), (2,4), (2,6)\}$

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

$\qquad (2,3), (2,4), (2,6)\} \longrightarrow ②$

From ① and ②

$A \times (B \cup C) = (A \times B) \cup (A \times C)$ Hence it is equal.

2. Let some elements of $A \times B$ are $(1,3), (2,4)$ and $n(A \times B) = 13$. Is this possible? why?

Ans)

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

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

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

$\underset{\text{4 pairs}}{\vee}$

$n(A \times B) = 13$, it is not possible

because $n(A \times B) = 4$

Another reason was 13 is a prime number there is only 1×13 or 13×1, it does not come any other multiplications.