

Topic  $\Rightarrow$  Relation  $\Rightarrow$

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

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

- (i)  $A \times (B \cap C)$       (ii)  $(A \times B) \cap (A \times C)$   
 (iii)  $A \times (B \cup C)$       (v)  $(A \times B) \cup (A \times C)$ .

Ans  $\rightarrow$

(i)  $B \cap C = \{3, 4\} \cap \{4, 5, 6\}$

$= \{4\}$

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

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

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

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

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

$A \times C = \{1, 2, 3\} \times \{4, 5, 6\}$

$= \{(1, 4), (1, 5), (1, 6), (2, 4), (2, 5), (2, 6),$   
 $(3, 4), (3, 5), (3, 6)\}$

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

Remaining two do yourself.

Ex-4. If  $P = \{1, 2\}$ , form  
Set  $P \times P \times P$

$$P \times P \times P = \{1, 2\}, \{1, 2\}, \{1, 2\}$$

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

Example-5

If  $R$  is the set of all real numbers, what do the Cartesian products  $R \times R$  and  $R \times R \times R$  represent?

Ans  $R \times R = \{(x, y) : x, y \in R\}$   
represent the Co-ordinates of all points in two dimensional space.

$R \times R \times R = \{(x, y, z) : x, y, z \in R\}$   
represent the Co-ordinate of all points in three-dimensional space.

Solve Ex-2.