Class 11 Solutions Chapter 2 Relations Ex 2.1 Q4

We have,

$a \in \{2, 4, 6, 9\}$

and, $b \in \{4, 6, 18, 27\}$

Now, a/b stands for 'a divides b'. For the elements of the given sets, we find that $2/4,\ 2/6,\ 2/18,\ 6/18,\ 9/18$ and $9/27$

$\therefore$ $\{(2,4),\ (2,6),\ (2,18),\ (6,18),\ (9,18),\ (9,27)\}$ are the required set of ordered pairs (a, b).

Class 11 Solutions Chapter 2 Relations Ex 2.1 Q5

We have,

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

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

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

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

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

Class 11 Solutions Chapter 2 Relations Ex 2.1 Q6

We have,

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

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

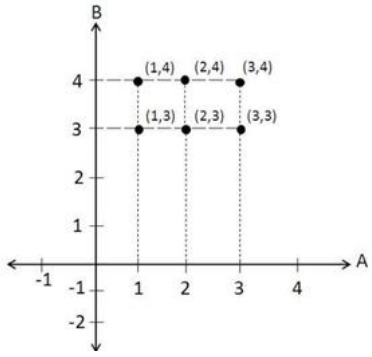
$= \{(1,3),\ (1,4),\ (2,3),\ (2,4),\ (3,3),\ (3,4)\}$

In order to represent $A \times B$ graphically, we follow the following steps:

(a) Draw two mutually perpendicular line one horizontal and other vertical.

(b) On the horizontal line represent the element of set A and on the vertical line represent the elements of set B.

(c) Draw vertical dotted lines through points representing elements of A on horizontal line and horizontal lines through points representing elements of B on the vertical line points of intersection of these lines will represent $A \times B$ graphically.



Class 11 Solutions Chapter 2 Relations Ex 2.1 Q7

We have,

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

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

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

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

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

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

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

$B \times B = \{2, 4\} \times \{2, 4\}$

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

and, $(A \times B) \cap (B \times A)$

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

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

$\Rightarrow \quad (A \times B) \cap (B \times A) = \{(2, 2)\}$.

Class 11 Solutions Chapter 2 Relations Ex 2.1 Q8

We have,

$n(A) = 5$ and $n(B) = 4$

We know that, if A and B are two finite sets, then $n(A \times B) = n(A) \times n(B)$

$\therefore \quad n(A \times B) = 5 \times 4 = 20$

Now,

$n[(A \times B) \cap (B \times A)] = 3 \times 3 = 9$ $\quad [\because A \text{ and } B \text{ have 3 elements in common}]$

********** END **********