



Class 11 Solutions Chapter 2 Relations Ex 2.3 Q11

Here, $A = \{a, b\}$

we know that,

$$\begin{aligned}\text{Number of relations} &= 2^{m \cdot n} \\ &= 2^{2 \cdot 2} \\ &= 2^4 \\ &= 16\end{aligned}$$

Number of relations on $A = 16$

Relations on A are given by

$$\begin{aligned}R = & \{a, a\}, \{a, b\}, \{b, a\}, \{b, b\} \\ & \{\{a, a\}, \{a, b\}\}, \{\{a, a\}, \{b, a\}\}, \{\{a, a\}, \{b, b\}\}, \\ & \{\{a, b\}, \{b, a\}\}, \{\{a, b\}, \{b, b\}\}, \{\{b, a\}, \{b, b\}\}, \\ & \{\{a, a\}, \{a, b\}, \{b, a\}\}, \{\{a, b\}, \{b, a\}, \{b, b\}\}, \\ & \{\{b, a\}, \{b, b\}, \{a, a\}\}, \{\{b, b\}, \{a, a\}, \{a, b\}\}, \\ & \{\{a, a\}, \{b, a\}, \{b, b\}\}, \{\{a, a\}, \{b, a\}, \{b, b\}\}\end{aligned}$$

Class 11 Solutions Chapter 2 Relations Ex 2.3 Q12

We have,

$$A = \{x, y, z\} \text{ and } B = \{a, b\}$$

$$\Rightarrow n(A) = 3 \text{ and } n(B) = 2$$

$$\Rightarrow n(A) \times n(B) = 3 \times 2 = 6$$

$$\Rightarrow n(A \times B) = 6$$

$$[\because n(A \times B) = n(A) \times n(B)]$$

So, there are $2^6 = 64$ relations from A to B .

$$\begin{aligned}[\because n(x) = a, n(y) = b \\ \Rightarrow \text{Total number of relations} = 2^{a \cdot b}]\end{aligned}$$

Class 11 Solutions Chapter 2 Relations Ex 2.3 Q13

We have,

$$R = \{(a, b) : a, b \in \mathbb{N} \text{ and } a = b^2\}$$

(i) This statement is not true because $(5, 5) \notin R$.

(ii) This statement is not true because $(25, 5) \in R$ but $(5, 25) \notin R$.

(iii) This statement is not true because $(36, 6) \in R$ and $(25, 5) \in R$ but $(36, 5) \notin R$.

Class 11 Solutions Chapter 2 Relations Ex 2.3 Q14

We have,

$$3x - y = 0$$

$$\Rightarrow 3x = y$$

$$\Rightarrow y = 3x$$

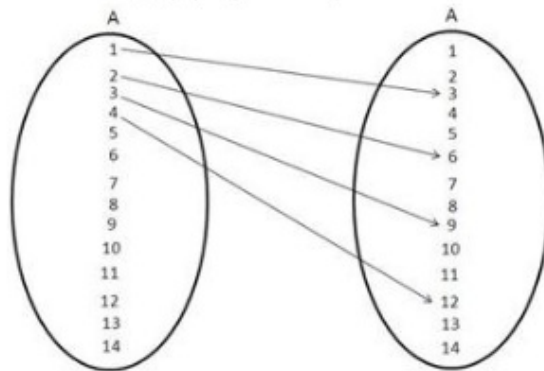
Putting $x = 1, 2, 3, 4$ we get, $y = 3, 6, 9, 12$ respectively

For $x > 4$, we get $y > 14$ which does not belong to set A .

$$\therefore R = \{(1, 3), (2, 6), (3, 9), (4, 12)\}$$

The arrow diagram representing R is as follows:

Clearly, $\text{Domain}(R) = \{1, 2, 3, 4\}$,
 $\text{Co-domain}(R) = \{1, 2, 3, 4, \dots, 14\}$ and
 $\text{Range}(R) = \{3, 6, 9, 12\}$



Class 11 Solutions Chapter 2 Relations Ex 2.3 Q15

We have,

$$R = \{(x, y) : y = x + 5, x \text{ is a natural number less than } 4, x, y \in \mathbb{N}\}$$

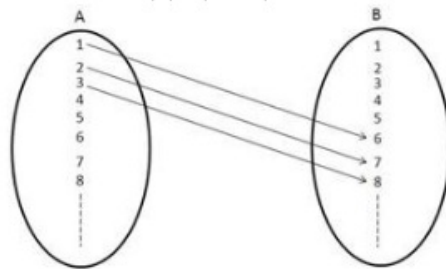
(i) Putting $x = 1, 2, 3$ we get, $y = 6, 7, 8$ respectively

\therefore Relation R in roster form is

$$R = \{(1, 6), (2, 7), (3, 8)\}$$

(ii) The arrow diagram representing R is as follows:

Clearly, $\text{Domain}(R) = \{1, 2, 3\}$ and
 $\text{Range}(R) = \{6, 7, 8\}$



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