Class 11 Solutions Chapter 2 Relations Ex 2.3 Q11

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

we know that,

Number of relations $= 2^{m.n}$

$= 2^{2.2}$

$= 24$

$= 16$

Number of relations on $A = 16$

Relations on A are given by

$R = \{a, a\}, \{a, b\}, \{b, a\}, \{b, b\}$

$\{(a, a), (a, b)\}, \{(a, a), (b, a)\}, \{(a, a), (b, b)\},$

$\{(a, b), (b, a)\}, \{(a, b), (b, b)\}, \{(b, a), (b, b)\},$

$\{(a, a), (a, b), (b, a)\}, \{(a, b), (b, a), (b, b)\},$

$\{(b, a), (b, b), (a, a)\}, \{(b, b), (a, a), (a, b)\},$

$\{(a, a), (b, a), (b, b)\}, \{(a, a), (b, a), (b, b)\}$

Class 11 Solutions Chapter 2 Relations Ex 2.3 Q12

We have,

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

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

$\Rightarrow$ $n\{A\} \times n\{B\} = 3 \times 2 = 6$

$\Rightarrow$ $n\{A \times B\} = 6$ $\quad [\because n\{A \times B\} = n\{A\} \times n\{B\}]$

So, there are $2^6 = 64$ relations from A to B. $\quad [\because n\{x\} = a, n\{y\} = b \Rightarrow$ Total number of relations $= 2^{a.b}]$

Class 11 Solutions Chapter 2 Relations Ex 2.3 Q13

We have,

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

(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,

$3x - y = 0$

$\Rightarrow \quad 3x = y$

$\Rightarrow \quad y = 3x$

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.

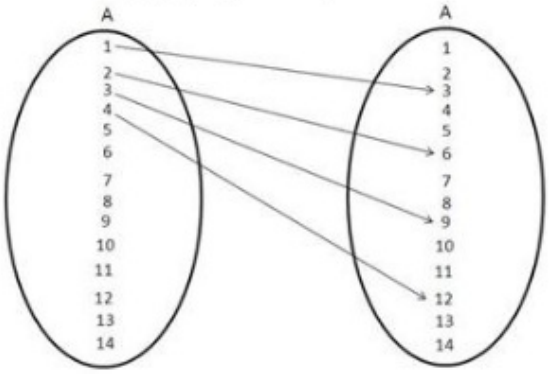
$\therefore \quad R = \{(1,3), (2,6), (3,9), (4,12)\}$

The arrow diagram representing R is as follows:

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

Co-domain $(R) = \{1, 2, 3, 4 \ldots, 14\}$ and

Range $(R) = \{3, 6, 9, 12\}$



Class 11 Solutions Chapter 2 Relations Ex 2.3 Q15

We have,

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

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

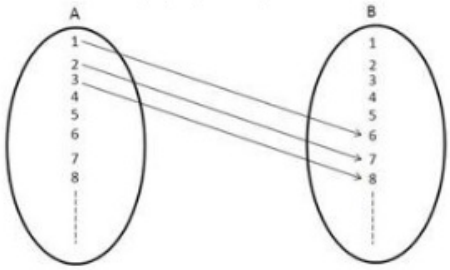
$\therefore \quad$ Relation R in roster form is

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

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

Clearly, Domain $(R) = \{1, 2, 3\}$ and

Range $(R) = \{6, 7, 8\}$



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