Domain and range of a relation : —

Let $R = \{(x,y) : x \in A, y \in B$ and $xRy\}$ be a relation from A to B. Then the set of first co-ordinate of every element of R is called domain of R and denote by Domain of R. (Dom(R)) and the set of second co-ordinate of its every element is called Range of R and denoted by Ran (R).

Ques — Let $A = \{2,4,6\}$ and $B = \{1,4,5,6\}$ then find the relation from A to B defined by " is less than or equal to ". Find out the domain and range of the relation —

Solu — $A \times B = \{(2,1), (2,4), (2,5), (2,6), (4,1), (4,4), (4,5), (4,6), (6,1), (6,4), (6,5), (6,6)\}$

Hence $R = \{(2,5), (2,6), (2,4), (4,4), (4,5), (4,6), (6,6)\}$

Dom (R) = $\{2,4,6\}$
Ran (R) = $\{4,5,6\}$

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Complement of a relation -

Consider a relation R from set A to B.
The complement of relation R denoted by $\bar{R}$ or R'
is a relation from A to B such that

$$R' = \{(a,b) : (a,b) \in R\}$$

Ques - Let R be a relation from x to Y, where $X = \{1,2,3\}$
and $Y = \{8,9\}$ and $R = \{(1,8),(1,9),(2,8),(3,9)\}$. Find
the complement of relation R.

Soln - $X \times Y = \{(1,8),(1,9),(2,8),(2,9),(3,8),(3,9)\}$

$R' = \{(2,9),(3,8)\} \rightarrow$ वो element जो R में न हो।

Inverse relation - Let R be a relation from a set A to B.

The inverse of relation R denoted by R^{-1} is a relation from B to A such that $bR^{-1}a$ iff aRb.

$$R^{-1} = \{(b,a) : (a,b) \in R\}$$

Thus, to find R^{-1} we write in reverse order are ordered pair belonging to R.

ues- Let $A = \{1, 2, 3\}$ and relation (R) is $\leq$ on A. Determine its inverse.

olu- $A = \{1, 2, 3\}$

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

$$R^{-1} = \{(1,1), (2,2), (3,3), (3,2), (3,1)(2,1)\}$$

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