

Functions

CARTESIAN PRODUCT:-

If A & B are two sets then $A \times B$ is called Cartesian product from set A to set B.

- Let set $A = \{ 1, 2, 3 \}$
- Let set $B = \{ 4, 5, 6 \}$

So, $A \times B = \{ (1, 4), (1, 5), (1, 6), (2, 4), (2, 5), (2, 6), (3, 4), (3, 5), (3, 6) \}$.

Number of terms in $A \times B$ = Number of terms in A
X Number of terms in B = $3 \times 3 = 9$

RELATION :- All the subset of the set $A \times B$ are called Relations from set A to set B.

If we find out subsets of $A \times A$ then relation is from set A to set A.

FUNCTION :- A relation which is a subset of $A \times B$ is called a function or mapping from A to B if

(i) If **for each** $a \in A$, there **exist** $b \in B$ such that $(a, b) \in f$

(ii) **No two ordered pairs** if f have the same first element

If $(a, b) \in f$, then b is called Image of a under f .



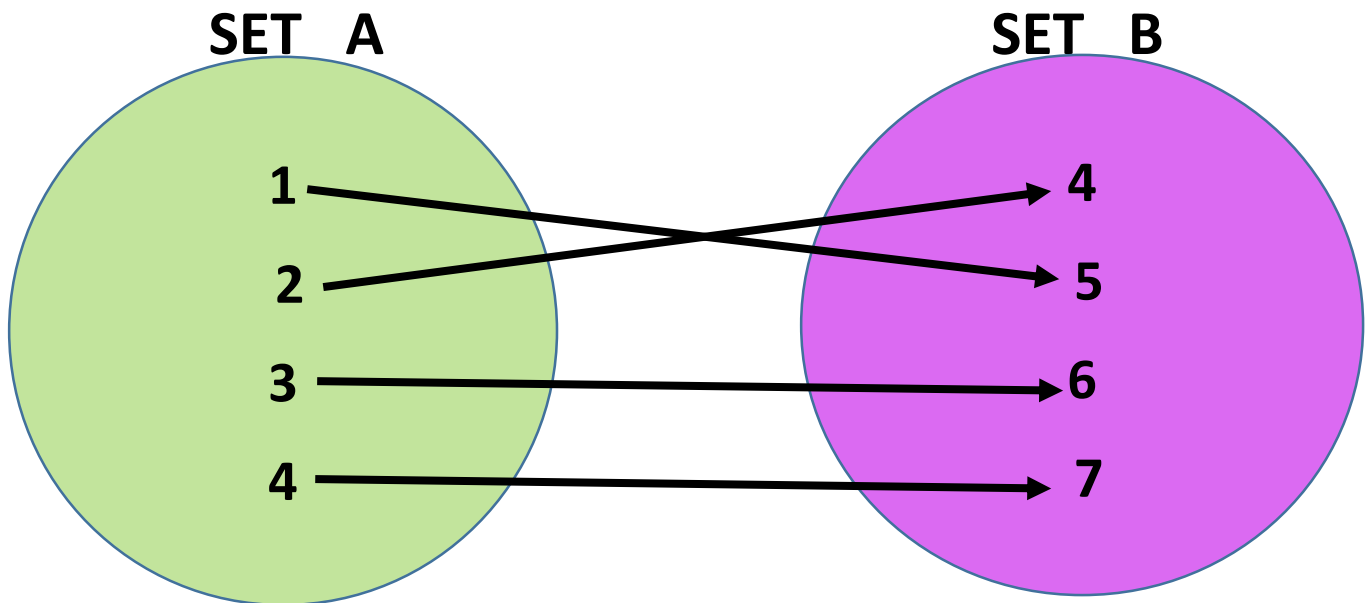
✚ All elements of set A are associated with elements in set B

✚ An element of set A is associated to a unique element in set B

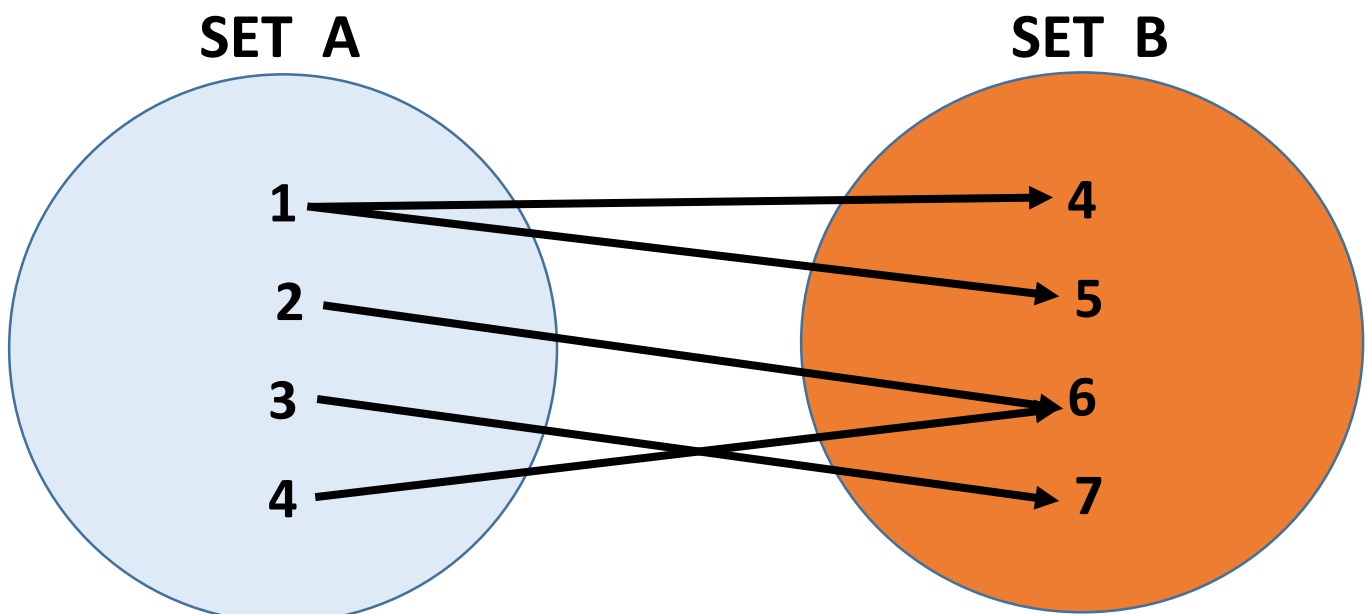
✚ Set A is called Domain of function and set B is called Co-Domain of functions. The elements in set B which are images of elements of set A called Range.

Example :- $A = \{1, 2, 3, 4\}$ $B = \{4, 5, 6, 7\}$

$R = \{(1, 5), (2, 4), (3, 6), (4, 7)\}$

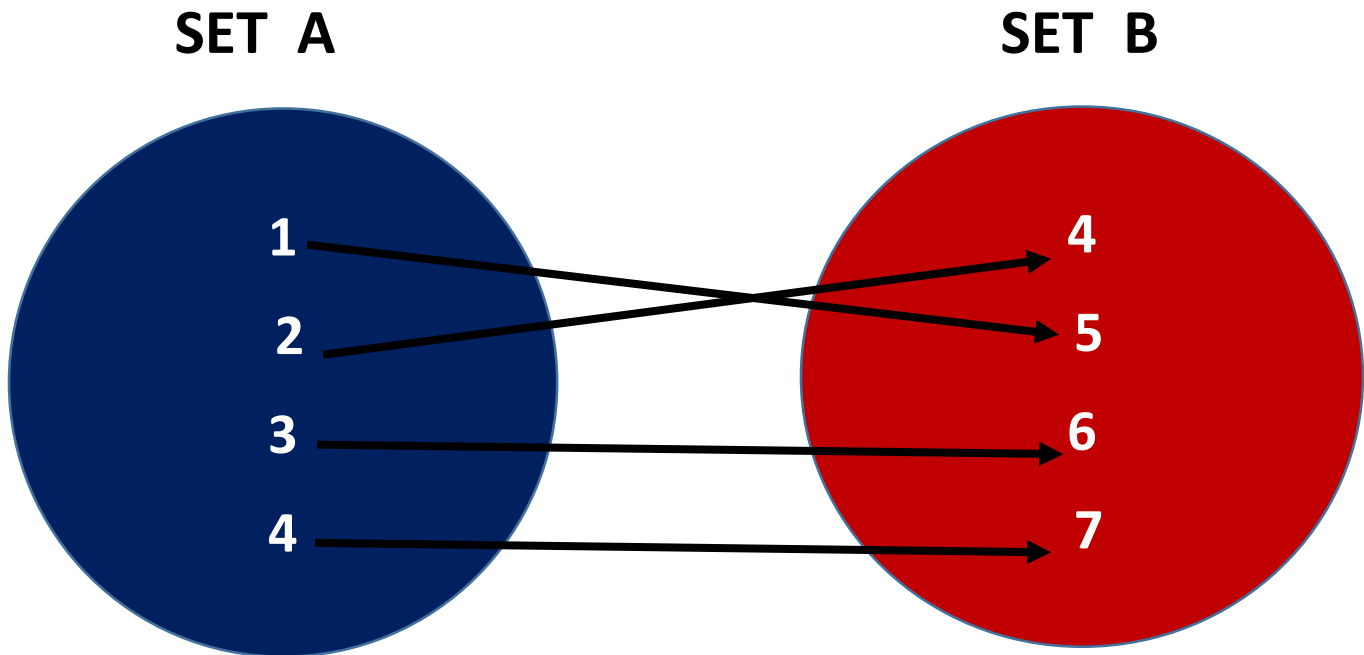


$R = \{(1, 4), (1, 5), (2, 6), (3, 7), (4, 6)\}$



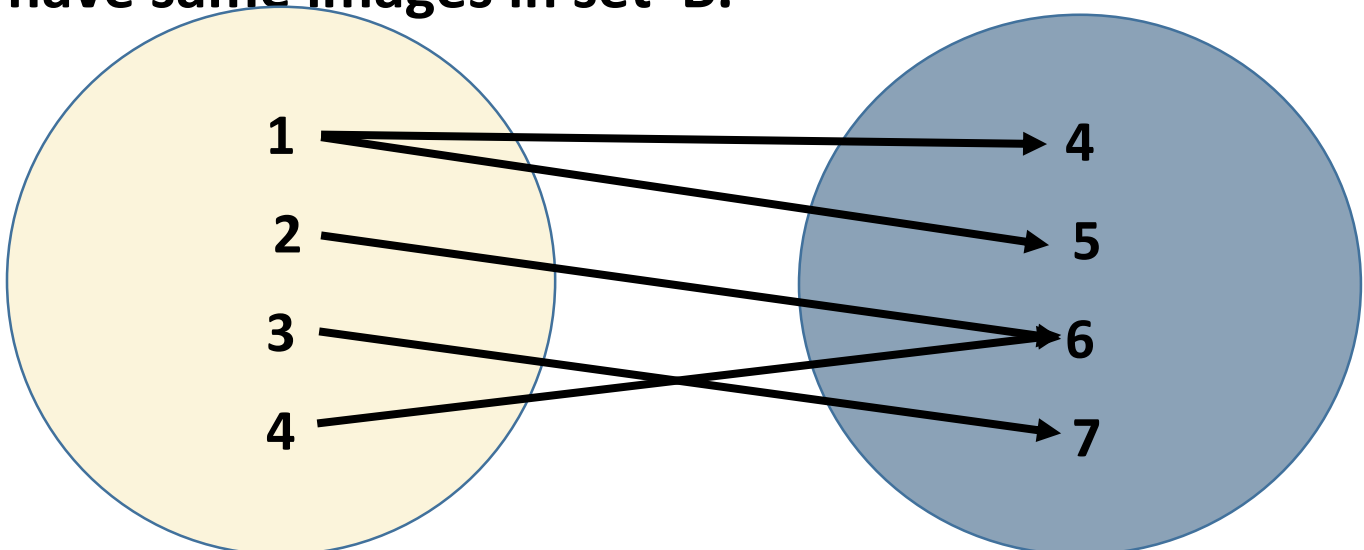
ONE – ONE FUNCTION (INJECTION)

A function (f) from A to B is said to be one – one function if different elements of set A have different images in set B .



MANY – ONE FUNCTION

A function (f) from A to B is said to be Many – one function if different elements of set A have same images in set B .

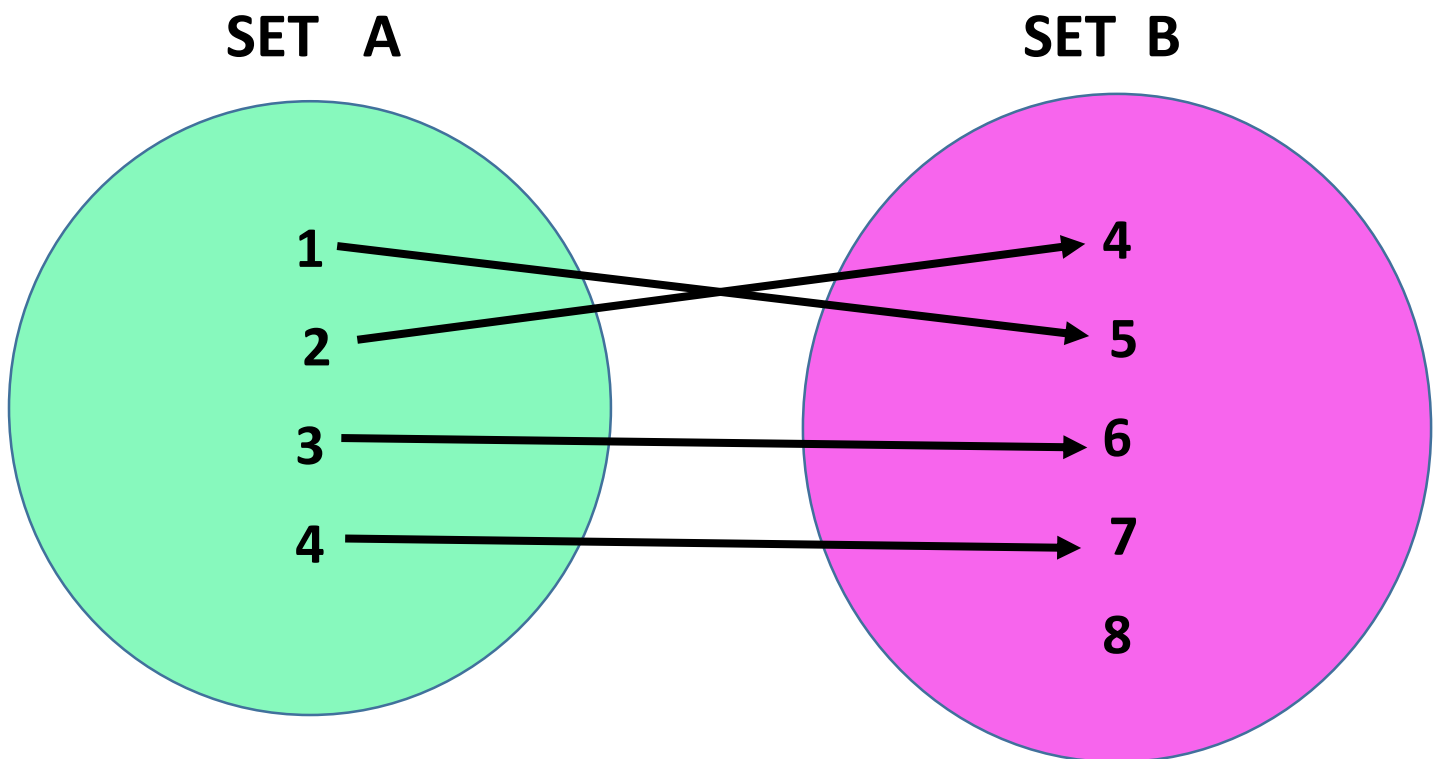


ONTO FUNCTION (SURJECTION)

A function (f) from A to B is said to be Onto function if every elements of set B is image of some element of set A. Range of $f =$ Co-Domain B.

INTO FUNCTION

A function (f) from A to B is said to be Into function if any elements of set B is not an image of some element of set A.



BIJECTIVE FUNCTION

A function (f) from A to B is said to be Bijective function if it is One - One and Onto function.