EQUAL SETS

The set are equal if and only if their number of elements and the member of elements are exactly same.

Example of equal sets: **A = {5,6,7}, B = {7,5,6}, C = {5,5,6,6,7,7}**

SPECIAL SYMBOLS FOR SETS

N = the set of **positive integers** : 1, 2, 3, ….

Z = the set of **integers** : ….., -2, -1, 0, 1, 2, …..

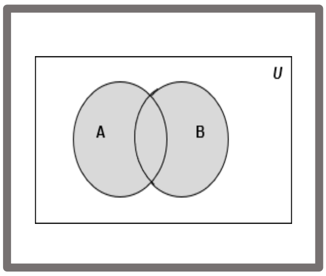
Q = the set of **rational numbers**

R = the set of **real numbers**

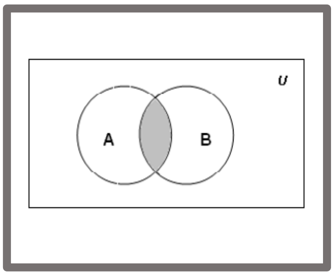
C = the set of **complex numbers**

OPERATION ON SETS

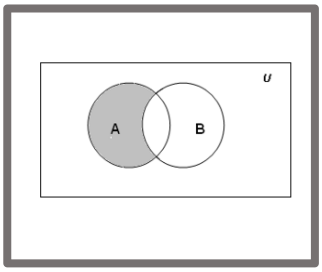
$\boldsymbol{A \cup B}$



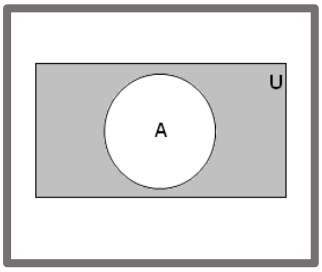
$\boldsymbol{A \cap B}$



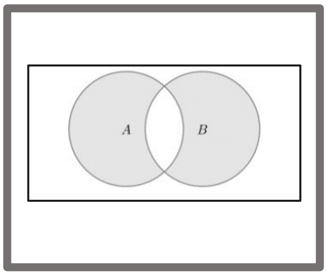
$\boldsymbol{A - B}$



$\boldsymbol{A'}$



$\boldsymbol{A \oplus B}$

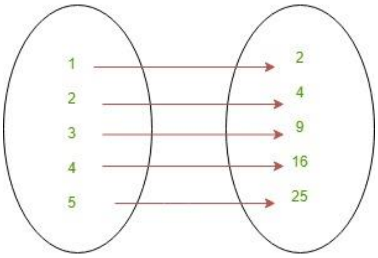


RELATION REPRESENTATION

GRAPHICALLY/ ARROW DIAGRAM

Example:

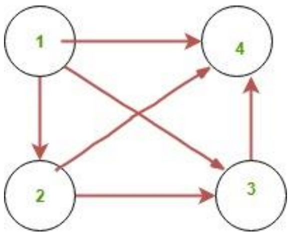
R= {(1, 1), (2, 4), (3, 9), (4, 16), (5, 25)}



DIGRAPH (DIRECTED GRAPH)

Example:

R= {(1,2), (1,3), (1,4), (2,3), (2,4), (3,4)}



MATRICES

Example:

Suppose that A = {1,2,3} and B = {1,2}. R= {(2, 1), (3,1), (3,2)}

In matrix form;

$$\boldsymbol{M_R} = \begin{bmatrix} \mathbf{0} & \mathbf{0} \\ \mathbf{1} & \mathbf{0} \\ \mathbf{1} & \mathbf{1} \end{bmatrix}$$

PROPERTIES OF RELATIONS

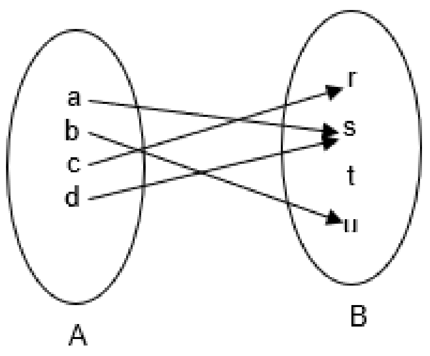
- **REFLEXIVE**
- **SYMMETRIC**
- **TRANSITIVE**

*A relation on a set A is called an **equivalence relation** if it is *reflexive*, *symmetric* and *transitive*.

IMPORTANT TERMS USED IN FUNCTIONS

- The element in set A is called the ***domain***
- The element in set B is called ***codomain***
- Unique element of B which is assign to A is called ***image / range.***

Example 1:



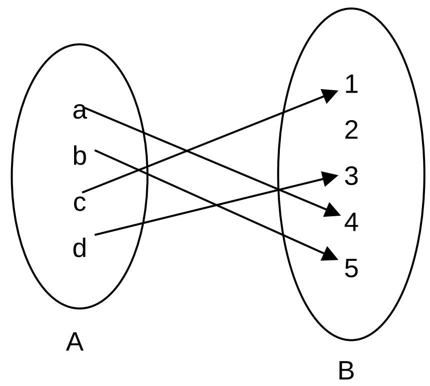
Domain = {a, b, c, d}
Codomain = {r, s, t, u}
Range/Image = {r, s, u}

ONE-TO-ONE FUNCTIONS

Example 2:

Determine whether the function f from {a, b, c, d} to {1, 2, 3, 4, 5} with $f(a) = 4$, $f(b) = 5$, $f(c) = 1$ and $f(d) = 3$ is one-to-one.

Solution: The function f is one-to-one.



ONTO FUNCTION