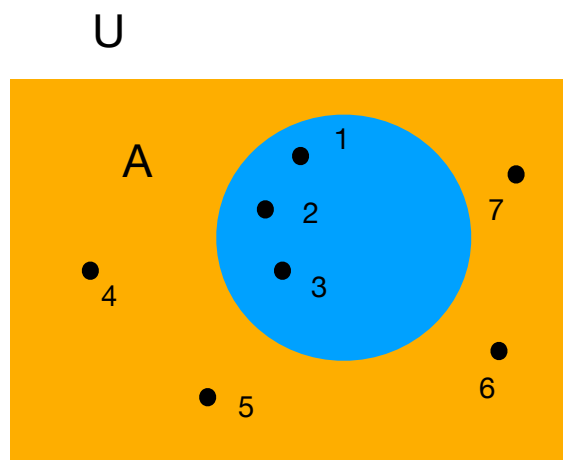


## Venn Diagram

Most of the relationships between sets can be represented by means of diagrams which are known as Venn Diagrams. Venn diagrams are named after the English logician John Venn. These diagrams consist of rectangles and closed curves usually circles. The universal set is represented by a rectangle and its subsets by circles.



In above figure

$U = \{1,2,3,4,5,6,7\}$  is the universal set.

$A = \{1,2,3\}$  is a subset.

### Union of sets

Let A and B be two sets. The union of A and B is the set which consist of all the elements of A and all the elements of B, the common elements being taken only once. The symbol  $\cup$  is used to denote the union. Symbolically we write  $A \cup B$  and usually read as A union B.

1. Let  $A = \{2,4,6,8\}$  and

$B = \{6,8,10,12\}$

Find  $A \cup B$

$$A \cup B = \{2,4,6,8,10,12\}$$

Note that the common elements 6 and 8 have been taken only once while writing  $A \cup B$

2. Let  $A = \{a,e,i,o,u\}$  and

$$B = \{a,i,u\}$$

$$B \subset A$$

$$A \cup B = \{a,e,i,o,u\}$$

It shows that union of sets A and its subset B is the set A itself i.e;  $B \subset A$  then  $A \cup B = A$

3. Let  $X = \{\text{Ram, Geeta, Akbar}\}$  be the set of students of class 10<sup>th</sup> who are in school cricket team. Let  $Y = \{\text{Geeta, David, Ashok}\}$  be the set of students from class 10<sup>th</sup> who are in school chess team. Find  $X \cup Y$  and interpret the set.

$$X \cup Y = \{\text{Ram, Geeta, Akbar, David, Ashok}\}$$

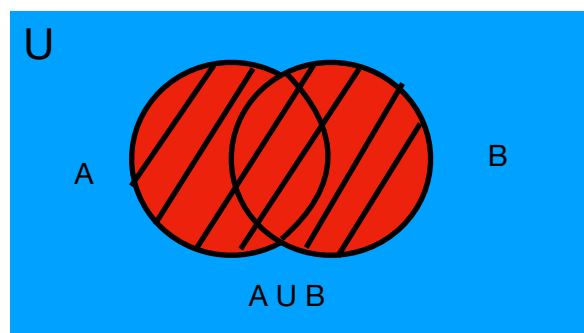
This is the set of students from class 10<sup>th</sup> who are in cricket team or chess team or both.

Definition : The union of two sets A and B is the set C which consists of all those elements which are either in A or in B (including those which are in both)

Symbolically we write

$$A \cup B = \{x : x \in A \text{ or } x \in B\}$$

The union of two sets can be represented by a Venn diagram as shown as in figure below



Intersection of sets : The intersection of sets A and B is the set of all elements which are common to both A and B. The symbol  $\cap$  is used to denote the intersection.

The intersection of sets A and B is the set of all elements which are common to both A and B..

Symbolically we write

$$A \cap B = \{x : x \in A \text{ and } x \in B\}$$

1. Let  $A = \{2,4,6,8\}$  and  $B = \{6,8,10,12\}$   
 $A \cap B = \{6,8\}$

2. Let  $A = \{a,e,i,o,u\}$  and  
 $B = \{a,i,u\}$

$B \subset A$        $A \cap B = B$

3. In example above only common element is Geeta which is in both the teams (Cricket and chess)

$$X \cup Y = \{ \text{Geeta} \}$$

Definition : The intersection of sets A and B is the set of all elements which belong to both A and B..

Symbolically we write

$$A \cap B = \{x : x \in A \text{ and } x \in B\}$$

The shaded portion in figure below indicates the intersection of A and B.

