

SETS AND FUNCTIONS

Sets and Their Representation:

A set is a collection of distinct elements or objects. Sets can be represented in two forms:

- a) **Roster or Tabular Form:** In this form, elements of the set are listed within braces { }.

For example, $A = \{1, 2, 3, 4\}$.

- b) **Set-Builder Form:** In this form, a property or condition satisfied by the elements is used to define the set.

For example, $A = \{x \mid x \text{ is an even number}\}$ represents the set of even numbers.

Cardinality of a Set: The cardinality of a set A , denoted as $|A|$, represents the number of elements in the set.

For example, if $A = \{1, 2, 3\}$, then $|A| = 3$.

Subset: A set A is said to be a subset of another set B , denoted as $A \subset B$, if every element of A is also an element of B .

Universal Set: The universal set, denoted as U , is the set that contains all the elements under consideration.

Empty set: The empty set, denoted as $\emptyset$ or $\{\}$, is a set that contains no elements.

Operations on Sets:

Union of Sets: The union of two sets A and B , denoted as $A \cup B$, is the set that contains all the elements present in A or B or both.

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

$$A \cup B = \{1, 2, 3, 4, 5\}$$

Intersection of Sets: The intersection of two sets A and B , denoted as $A \cap B$, is the set that contains elements common to both A and B .

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

$$A \cap B = \{3\}$$

Complement of a Set: The complement of a set A with respect to a universal set U , denoted as A' , is the set that contains all elements in U but not in A .

Example: $U = \{1, 2, 3, 4, 5\}$, $A = \{3, 4\}$