

Mathematics I (Unit 1)

Sets

Definition of Sets:

- A well defined collection of objects is called a set.
- Collection of distinct objects of the same type.

Not well defined	Well defined
A group of intelligent students	Score more than 96%
Group of most talented cricketer	Most talented cricket team
Group of most talented writer	Most talented novel writer

- Sets are usually denoted by the capital letters **A, B, C, X, Y, Z** etc.
- The elements of a set are represented by small letters **a, b, c, x, y** and **z** etc.

Example: Suppose set **A = {a, b, c, d, e}**

If **a** is an element of a set **A**, then we say that **a** belongs to **A** (which is represent as **a ∈ A**). If **g** is not an elements of set **A**, then we say that **g** doesn't belongs to **A** (which is represent as **g ∉ A**).

Some examples of sets:

a) N being the set of natural numbers and $0 \notin N$

Ans: $N = \{1, 2, 3, 4, 5, \dots\}$

b) P being the set of perfect square numbers

Ans: $p = \{4, 9, 16, 25, 36, 49, \dots\}$

Symbols used for represent the numbers: -

N : the set of all natural numbers

$N = \{1, 2, 3, \dots\}$

Z : the set of all integers

$Z = \{\dots, -3, -2, -1, 0, 1, 2, 3, \dots\}$

Q : the set of all rational numbers

$Q = \{\dots, -\frac{1}{3}, -\frac{1}{2}, 0, \frac{1}{2}, \frac{1}{3}, \dots\}$

R : the set of real numbers

$$R = \{\text{rational numbers \& irrational numbers}\}$$

Where rational numbers are, $-\frac{1}{3}$, $-\frac{1}{2}$, 0, $\frac{1}{2}$, $\frac{1}{3}$, and irrational numbers are -2.15, - 1.15, $\sqrt{2}$, $\sqrt{3}$, $-\sqrt{2}$, $-\sqrt{3}$ etc.

Z⁺: the set of positive integers

$$Z^+ = \{1, 2, 3, \dots\}$$

Z⁻: the set of negative integers

$$Z^- = \{-1, -2, -3, \dots\}$$

Q⁺: the set of positive rational numbers

$$Q^+ = \left\{ \frac{1}{2}, \frac{1}{3}, \dots \right\}$$

Q⁻: the set of negative rational numbers

$$Q^- = \left\{ -\frac{1}{2}, -\frac{1}{3}, \dots \right\}$$

R⁺: the set of positive real numbers

R⁻: the set of negative real numbers