Real Analysis

Q What you mean by Set?

A set is a well-defined collection of objects. Each object belonging to a set is called an element of the set or member of the set.

It generally use capital letters A, B, C,...etc. to denote sets and lower case letters a, b, c, etc. to denote elements of a set.

The symbol '∈' is used to indicate "belongs to".

Thus 'p' is an element of S

is written as,

P ∈ S.

The symbol '∉' is used to indicate 'does not belong to'

i.e., P ∉ S.

Ex: Let:

1. X = {A bunch of grapes}

2. N = {1, 2, ...}

A set of all Natural numbers

Another Definition : Set

Sets are represented as a collection of well-defined objects or elements and

of does not change from
person to person. A set is
represented by a capital capital
letter Symbol and the number
of elements in the finite set
is represented as the cardinal
number of a set.

Elements of sets:

Let us take an example:

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

Since a set is usually
represented by the capital
letter. Here A is the set

and 1, 2, 3, 4, 5 are
the elements of the set or
a member of a set. The
elements that are written
in the set are in any order
and it cannot be repeated.

All the set elements are
represented in small letter
in case of alphabets. Also,
we can write it as $1 \in A$,
$2 \in A$ etc. The cardinal number
of the set is 5. Some
commonly used sets are as
follows:

N : Set of all natural numbers

Z : Set of all integers

Q : Set of all rational numbers

R : Set of all real numbers

Z^+ : Set of all positive integers.

Order of sets:

The order of a set defines the number of elements a set is having. It describes the size of a set. The order of a set is also known as the cardinality.

The size of set whether it is a finite set or infinite set. Said to be set of finite order or infinite order respectively.

Also we can check that following:

Sets for class 11

Sets Subset and Superset

Union of Sets

Finite and infinite Sets

Power Set

e ___ **Representation of sets:**

The Sets are represented in curly braces { }. For example {2, 3, 4} or {a, b, c} or {Bat, Ball}. The elements in the Sets are depicted in either the statement form, Roster form or Set Builder form.

Statement Form:

In Statement form, the well-defined descriptions of a member of a set are written and enclosed in the curly brackets.

For example; the set of even numbers less than 15.

In Statement form, it can be written as

{ even numbers less than 15}.

Roster Form:

In Roster form, all the elements of a set one listed.

For example:

the set of natural numbers less than 5.

Natural numbers N = 1, 2, 3, ...

Natural number less than 5

= 1, 2, 3, 4

∴ The set is N = {1, 2, 3, 4}

Set Builder form:

The general form is $A = \{x, property\}$

$A = \{x : property\}$

For example:

Write the following sets in set builder form

For example:

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

Solution:

$2 = 2 \times 1$
$4 = 2 \times 2$
$6 = 2 \times 3$
$8 = 2 \times 4$

So, the set builder form is $A = \{x : x = 2n,$
$$n \in N \text{ and } 1 \leq n \leq 4\}$$

Types of sets:

We have a number of different sets in maths.

They are empty sets, finite set & infinite sets, Equality of sets, Subsets, proper set etc.

Let us go through the classification of sets here:

Empty Set:

A set which not contain any element is called an empty set or void set. It is denoted or null set. It is denoted by $\{\}$ or ϕ.

For example:

1. An Builder form
$$\phi = \{x : x \text{ is a natural number whose square is 2}\}$$

2. A set of apples in the