

## Types of Sets (1-2)

**Cardinality of Sets:** It stands for the number of elements in the set.

Based on the cardinality, the sets are of the following types:

- ① **NULL SET** The set having no elements. It is represented by  $\{\}$  or  $\phi$ .
- ② **SINGLETON SET** A set having only one element.
- ③ **FINITE SET** Set having elements which can be counted.
- ④ **INFINITE SET** Set having elements which can not be counted.

\* Special Sets Some sets are specific to the study of mathematics. As such they are given special symbols. These symbols are used in the study of sets.

**Natural Numbers** We define natural numbers to be

$$\mathbb{N} = \{1, 2, 3, 4, \dots\}$$

Natural numbers are closed under addition and multiplication.

**Integers** we define integers as

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

Integers are closed under addition, subtraction and multiplication.

Rational Numbers we define rational numbers to be  
$$\mathbb{Q} = \left\{ \frac{p}{q} : p, q \in \mathbb{Z}, q \neq 0 \right\}$$

Rational numbers are closed under addition, subtraction, multiplication and division.

### Irrational Numbers

Irrational = { Infinite, non-repeating decimals }  
It is impossible to write down the irrational numbers.

we use special symbols as  $\pi, \sqrt{2}$  etc.

### Real Numbers

Represented by the symbol  $\mathbb{R}$

Real Numbers include natural numbers, integers, rational and irrational