SETS

All the vowels of english alphabets:
{a, e, i, o, u}

- Factors of 10 - {1,2,5,10}
  Collection of top 10 most talented people in India.

V = {a, e, i, o, u}

1. Set defined by Capital letters
2. Elements/members/objects of set are enclosed within { }

a is a member of set V
= a belongs to V
= $a \in V$

. - b is not a member of V
= b does not belong to V
= $b \notin V$

1. Natural numbers: N
   {1, 2, 3, 4, 5, ……..}
2. Whole Numbers: {0, 1, 2, 3, 4, …….} W
3. Integers: Z {….., -3, -2, -1, 0, 1, 2, 3, …… }
4. Positive integers: Z^+ Z^-
5. Rational Numbers: Q

$p/q \Rightarrow q \neq 0$

5/0

2/3, 10/5, 5 = 5/1

2/3 = 0.666666666666
13/7 = 1.85714 285714 2

10/6 = 25

6. Irrational numbers:

$\pi = 3.1415\ldots$

$\sqrt{2} = 1.4$

$\sqrt{25}$

7. Real numbers: $\mathbb{R}$

$\mathbb{Q} + \mathbb{R}$

R^+ R^-

Cardinality of a set:

$V = \{a,e,i,o,u\}$

Cardinality of set $V = 5$

$n(V) = 5$

Set representation

Roster method/
Tabular method

$V = \{a, e, i, o, u\}$

Actual elements of set

Set-builder form

$V = \{x : x \text{ is a vowel of english alphabet}\}$

s.t.

Property common to all elements of set

Empty sets: $\{\}$ ϕ

A = { set of all the Indian states which are outside Asia }

= { }

B = {x : 7 < x < 11, x is prime }

= { }

Finite/Infinte sets:

$V = \{a, e, i, o, u\}$ → 5

$Z = \{1, 2, 3, 4, 5, ...\}$ → ∞

Equal Sets:

- Order of elements is not imp.
- Write elements once

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

$C = \{2, 3, 4, 5, 6\}$

$A = B \quad B \neq C$

$A \neq C$

Subsets:

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

$B = \{2, 4, 3\}$

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

$B \subset A \Rightarrow A \supset B$

$C \rightarrow$ Is a subset of

$A \not\subset B$ Is not a subset of

$C \subset A$ & $A \subset C$

$\Downarrow$

$A = C$

$A \subset A$

$A \supset A$

Power Sets:

$K = 2^K$

$n(A) = K$

$n(P(A)) = 2^K$

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

$2^3 = 8$

$\{1, 2, 3\}, \{1,2\}, \{1,3\}, \{2,3\}, \{1\}, \{2\}, \{3\}, \{\}$. ---- Subsets of A

P(A) = { {1, 2, 3}, {1,2} ,{1,3}, {2,3}, {1}, {2}, {3}, { } }

Power set of A = P(A) = { {1, 2, 3}, {1,2} ,{1,3}, {2,3}, {1}, {2}, {3}, { } }

2 x 2 x 2

Universal Set:

A = set of all prime numbers { 2 3 5 7 11 . . . }

B = set of all even numbers { 0 2 4 . . .

C = set of all odd numbers { 1 3 5 . . .

Z = { . . . , -2, -1, 0, 1, 2, 3, . . }

A ⊂ Z B ⊂ Z C ⊂ Z

∪ (A, B, C) = Z