Sets

A set is a well defined collection of objects.

$A = \{1, 2, 3, 4\}$ — tabular or Roster form

$A = \{x : x \leq 4, x \in N\}$ - Set builder form.

Finite set

- Finite number of elements in a set

Infinite set

- Infinite number of elements in a set.

Null set

No element in a set

$\phi = \{\}$

- empty set
- void set

Singleton

- only one element in a set.

Equal sets

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

$A = B$

$A = \{WOLF\}$ $B = \{FOLLOW\}$

$A = B$

Equivalent set

$n(A) = n(B)$

Sub set

$A = \{1, 2, 3, 4, 5, 6\}$ $B = \{2, 4, 6\}$

$B \subseteq A$

$\{\}$ - is a subset

- set itself a subset

A set has 2^n - no. of subsets n - no. of elements.

Proper subset

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

B is proper subset of A

All elements of B in A but not all elements of A in B is proper subset.

Power set

Collection of all subsets of a set is known as power set.

Universal set

If all the given sets are subsets of U, then the set U is called universal set.

Complement of a set

A' or A^c

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

Cartesian product

$A = \{1, 2, 3\}$ $B = \{x, y\}$

$A \times B = \{(1, x) (2, x) (3, x) (1, y) (2, y) (3, y)\}$

$n(A) \times n(B) = n(A \times B)$

Commutative laws

$A \cup B = B \cup A$

$A \cap B = B \cap A$

Associative laws

$(A \cup B) \cup C = A \cup (B \cup C)$

$(A \cap B) \cap C = A \cap (B \cap C)$

Distributive laws

$A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$

$A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$

Identity laws

$A \cup \phi = A$

$A \cap U = A$

De-morgan's law

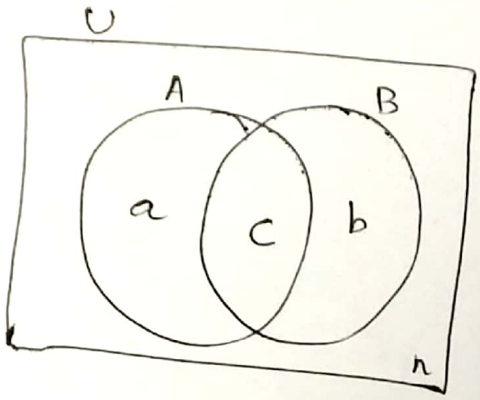
$(A \cup B)' = A' \cap B'$

$(A \cap B)' = A' \cup B'$

$A \cup A = A$

$A \cap A = A$

Venn diagram - 2 Sets

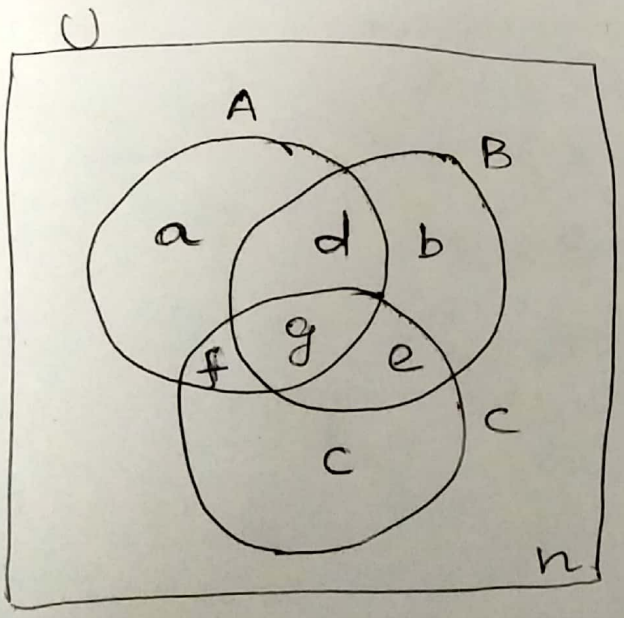


a - A only
b - B only
c - Both A & B
n - not in A & B
U - Total

Atleast 1 = a+b+c

Almost 1 = a+b+n

Venn diagram - 3 Sets



a - A only
b - B only
c - C only
d - A & B only
e - B & C only
f - A & C only
g - all A & B & C
n - not in A, B & C
U - total

Atleast 1 : a+b+c+d+e+f+g
Tot - n

Atleast 2 : d+e+f+g

Almost 1 : a+b+c+n

Atmost 2 : a+b+c+d+e+f+n
Tot - g

Venn diagram - 4 sets