

MATH

Set \rightarrow set is a well define collection of distinct object.

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

$B = \{P, Q, R, S, T\}$

(i) Roster or tabular

$$\rightarrow \{1, 2, 3, 4\}$$

(ii) Set builder method

$$\rightarrow A = \{x : x \text{ is Natural no.}\}$$

$$B = \{x : x \text{ is odd No.}\}$$

$$\rightarrow \{1, 3, 5, 7, 9, 11, 13\}$$

Symbol :-

- (i) \cup - union
- (ii) \cap - intersection
- (iii) \emptyset - Null
- (iv) \subset - Subset
- (v) \subseteq - Equal subset
- (vi) \in - Element
- (vii) \notin - Non Element.

* Type of set

(i) finite set \rightarrow which set have countable

e.g - all natural no.

all even no.

(ii) infinite \rightarrow which is not countable

ex \rightarrow the stars of sky

the partical of sand

(iii) single set \rightarrow

e.g - $\{2\}$

(iv) null set $\rightarrow \{\}$

(v) sub sets \rightarrow $A = \{1, 10, 15\}$

$$B = \{1, 3, 5\}$$

$$C = \{5, 15\}$$

$$\underline{B \subseteq A}, \quad \underline{C \subseteq A}$$

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

$$A \subseteq B$$

$$B \subseteq C$$

$$C \subseteq A$$

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

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

$$E = \{3, 2, 5\}$$

$$F = \{2, 4\}$$

$$\text{cardinal set} \rightarrow A = \{1, 2, 3, 4, 5\}$$

$$B = \{4, 6, 8, 7\}$$

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

$$n(A) = 5$$

$$n(B) = 4$$

$$n(C) = 3$$

Ans

$$A' / A^c = U - A$$

$$\text{universal } (U) \rightarrow \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20\}$$

$$A = \{1, 3, 5, 7, 9, 11, 13, 15\}$$

$$B = \{2, 4, 6, 8, 10, 12, 14, 16, 18, 20\}$$

$$C = \{3, 6, 9, 12, 15, 18\}$$

$$A' = U - A = \{2, 4, 6, 8, 10, 12, 14, 16, 18, 20\}$$

$$B' = U - B = \{1, 3, 5, 7, 9, 11, 13, 15, 17, 19\}$$

$$C' = \{1, 2, 4, 5, 7, 8, 10, 11, 13, 14, 16, 17, 19, 20\}$$

$\cup \rightarrow$ union :-

$(A \cup B) \cup C$

Q. $A = \{a, e, i, o, u\}$

$B = \{a, d, e, i, g\}$

$C = \{f, g, h, i\}$

Q. (i) $A \cup B = \{a, e, i, g, d, o, u\}$

(ii) $A \cup B \cup C = \{a, e, i, o, u, d, f, g, h\}$

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

$B \cup C = \{a, d, e, i, f, g, h\}$

$A \cup (B \cup C) = \{a, e, i, o, u, d, f, g, h\}$

Set :-

$A = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$

$B = \{1, 3, 5, 7, 9, 10\}$

$C = \{2, 4, 6, 8, 10\}$

Q. $\oplus (A \cup B) = (B \cup A)$

$$A \cup B = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$$

$$B \cup A = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$$

RHS = LHS

Q. $A \cup B \cup C = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$

$B \setminus C$.

set: - $U = \{1 \text{ to } 15\}$

$$A = \{1, 3, 5, 7, 9, 11, 13, 15\}$$

$$B = \{2, 4, 6, 8, 10, 12, 14\}$$

$$C = \{3, 6, 9, 12, 15\}$$

(i) $A' \cup B' = ?$

$$\textcircled{1} A' = U - A = \{2, 4, 6, 8, 10, 12, 14\}$$

$$B' = U - B = \{1, 3, 5, 7, 9, 11, 13, 15\}$$

$$C' = U - C = \{1, 2, 4, 5, 7, 8, 10, 11, 13, 14\}$$

(ii) $A' \cup B' = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15\}$

(iv) $(A \cup B)' \cap C = \{X1 \text{ to } 15\} \setminus \{3, 6, 9, 12, 15\}$

(v) $A' \cup B = \{2, 4, 6, 8, 10, 14\} \setminus \{3, 6, 9, 12, 15\}$

Venn diagram

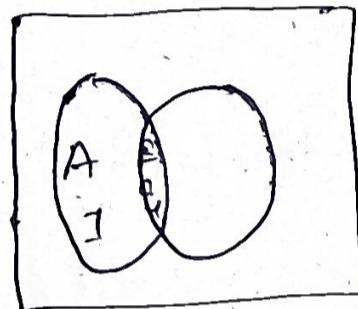
developed by John

$$A = \{ A, e, i, o, u \}$$

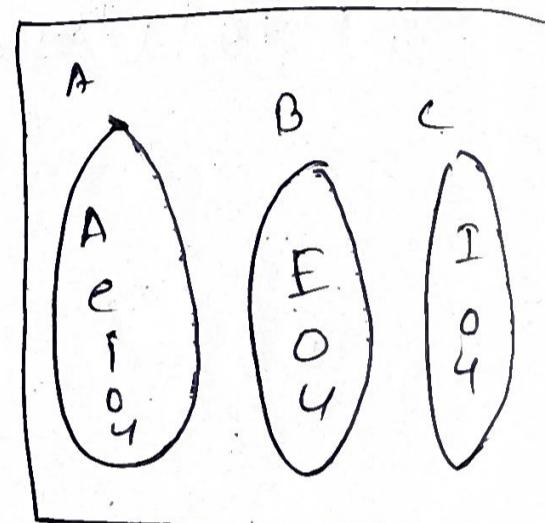
$$B = \{ E, O, U \}$$

$$C = \{ I, O, U \}$$

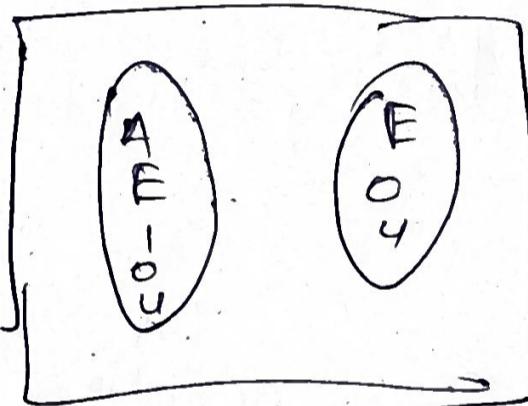
(i) $A \cap B =$



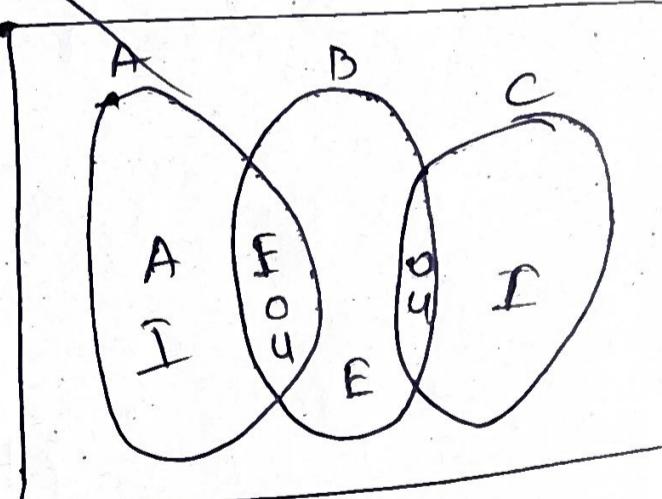
(ii) $A \cup B \cup C =$



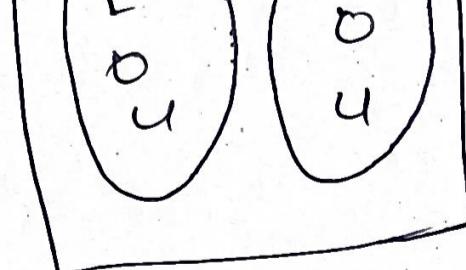
(iii) $A \cup B =$



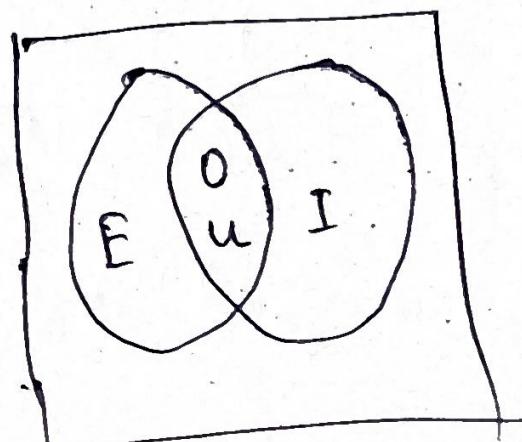
(iv) $A \cap B \cap C =$



(v) $B \cup C =$



(vi) $B \cap C =$

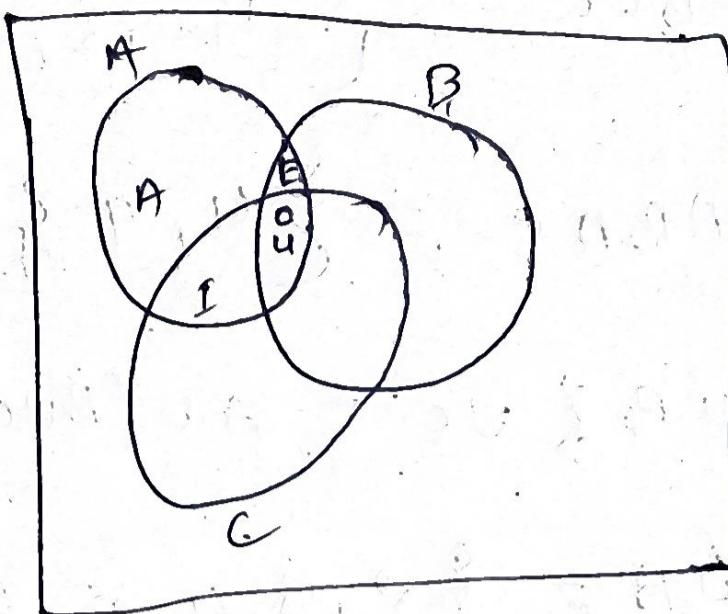


Q. $A \cap B \cap C$

$$A \cap B = \{ E, O, U \}$$

$$B \cap C = \{ O, U \}$$

$$A \cap C = \{ I, O, U \}$$



Q. Find the cardinal no.

A, B, C, D, E

$$A = \{ 1 \text{ to } 15 \text{ Natural no.} \} \quad n(A) = 15$$

$$B = \{ 5 \text{ to } 20 \text{ odd no.} \} \quad n(B) = 8$$

$$C = \{ 10 \text{ to } 20 \text{ even no.} \} \quad n(C) = 6$$

$$D = \{ \text{multiple of two till } 20 \} \quad n(D) = 10$$

Q. $A = \{ 3, 4, 5, 7, 9, 11, 13 \}$

$$B = \{ 2, 4, 6, 9, 10 \}$$

$$C = \{ 1, 3, 4, 6, 9, 15 \}$$

$$Q. A \cup B \cup C = \{1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 13, 15\}$$

$$Q. A \cap B \cap C = \{4, 9\}$$

$$Q. \{A \cup B\} \cup C = A \cup (B \cup C)$$

$$A \cup B = \{2, 3, 4, 5, 6, 7, 9, 10, 11, 13, 15\}$$

$$(A \cup B) \cup C = \{1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 13, 15\}$$

$$(B \cup C) = \{1, 2, 3, 4, 6, 9, 10, 15\}$$

$$A \cup (B \cup C) = \{1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 13, 15\}$$

$$\underline{\text{LHS} = \text{RHS}}$$

$$Q. (A \cup B) \subseteq (B \cup A)$$

$$A \cup B = \{2, 3, 4, 5, 6, 7, 9, 10, 11, 13, 15\}$$

$$B \cup A = \{2, 3, 4, 5, 6, 7, 9, 10, 11, 13, 15\}$$

$$\underline{\text{LHS} = \text{RHS}}$$

$$Q. A \cap B \subseteq B \cap A$$

$$A \cap B = \{4, 9\}$$

$$B \cap A = \{4, 9\}$$

$$\underline{\text{LHS} = \text{RHS}}$$

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

$$B \cap C = \{4, 6, 9\}$$

$$A \cap (B \cap C) = \{4, 9\}$$

$$A \cap B = \{4, 9\} \quad \underline{LHS = RHS}$$

$$(A \cap B) \cap C = \{4, 9\}$$

* Application of set

$$\textcircled{1} \ n(A \cup B) = 120$$

$$n(A) = 60$$

$$n(B) = 50$$

$$n(A \cap B) = ?$$

$$\textcircled{2}, n(A) = 80$$

$$n(B) = 40$$

$$n(A \cap B) = 10$$

$$n(A \cup B) = ?$$

$$\textcircled{3} \ n(A)$$

$$Q. n(A \cup B) = n(A) + n(B) - n(A \cap B)$$

$$100 = 40 + 60 - n(A \cap B)$$

$$100 = 100 - n(A \cap B)$$

$$\underline{n(A \cap B) = 0}$$

1 Q. in a class 150 students 50 read english.

40 reads hindi. How many students reads both hindi and english

2 Q. in a village 60 person educated; 85 y. artist. How many person are both educated and artist.

$$① \text{ English} = (A) \text{ soln: } n(A \cup B) = n(A) + n(B) - n(A \cap B)$$

$$\text{Hindi} = (B)$$

$$n(A \cup B) = 150$$

$$n(A) = 50$$

$$n(B) = 80$$

$$n(A \cap B) = ?$$

$$150 = 50 + 80 - n(A \cap B)$$

$$150 = 70 - n(A \cap B)$$

$$n(A \cap B) = -80$$

Bought hai

$$n(A \cup B) = 100\%$$

$$n(A) = 65\%$$

$$n(B) = 85\%$$

$$n(A \cap B) = ?$$

$$n(A \cap B) = ?$$

$$n(A \cup B) = n(A) + n(B) - n(A \cap B)$$

$$100 = 65 + 85 - n(A \cap B)$$

$$100 = 150 - n(A \cap B)$$

$$\begin{aligned} n(A \cap B) &= 150 - 100 \\ &= 50 \end{aligned}$$

D. There are 100 people in this town 40 are wearing Kangoli 30 are wearing Bangoli. How many person is only wearing both?

$$n(A \cup B) = 100$$

$$n(A) = 40$$

$$n(B) = 30$$

$$n(A \cap B) = ?$$

$$n(A \cup B) = n(A) + n(B) - n(A \cap B)$$

$$100 = 40 + 30 -$$

$$n(A \cap B) = 100 - 70 = 30$$

only Boys like tea) - $n(A \cap B)$

$$40 \rightarrow 30 \quad 20$$

$$\text{only girls} = 30 - 30 = 0$$

Q. in a group 70 persons 30 like tea, 20 like coffee not tea, how many person like tea & coffee both with.

$$n(A \cup B) = 70$$

$$\text{Tea } n(A) = 30$$

$$\text{coffee } n(B) = 20$$

$$n(A \cap B) = ?$$

$$n(A \cup B) = n(A) + n(B) - n(A \cap B)$$

$$70 = 50 - n(A \cap B)$$

$$n(A \cap B) = \underline{\underline{20}}$$