Sahil Gandhi

Tutorial 0

1. Show that the set of letter needed to spell "CATARACT" and set of letters needed to spell "tract" are equal.

⇒ A = {letters of CATARACT} = {C, a, t, r}
B = {letters of TRACT} = {t, r, a, c}

From this two A = B.

2. The following sets are equal.

Sol (i) $A = \{1, 2, 3\}$ $B = \{x : x \in R \; x^2 - 2x + 1 = 0\}$

$x^2 - x - x + 1$
$x(x-1) - 1(x-1)$

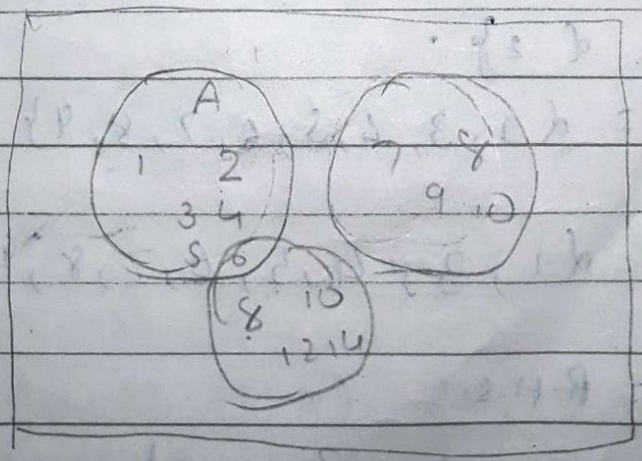
$A = \{1, 2, 3\}$ $B = \{1\}$

$A \neq B$

Show that

3. If $A = \{1, 2, 3, 4, 5, 6\}$, $B = \{7, 8, 9, 10\}$ and $C = \{6, 8, 10, 12, 14\}$ then A and B are disjoint sets, while A and C are intersecting sets.

Sol:- Here $A \cap B = \phi$ so it is disjoint set.



$A \cap B \neq \phi$ null set

~~$A \cap C = 6$~~

$A \cap C = \{6\}$ singelton set.

4. Let $U = \{1, 2, 3, 4, \ldots 9\}$ $A = \{2, 4, 6, 8\}$
$B = \{2, 3, 5, 7\}$, verify that :
(i) $(A \cup B)' = A' \cap B'$ (ii) $(A \cap B)' = A' \cup B'$

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

L.H.S. $= (A \cup B)'$

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

$(A \cup B)' = \{1, 9\}$ → L.H.S.

R.H.S. $= A' \cap B'$

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

$A' \cap B' = \{1, 9\}$ → R.H.S.

L.H.S = R.H.S Hence Proved.

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

L.H.S. $= (A \cap B)'$

$A \cap B = \{2\}$.
$(A \cap B)' = \{1, 3, 4, 5, 6, 7, 8, 9\}$ ⇒ L.H.S.

$A' \cup B' = \{1, 3, 4, 5, 6, 7, 8, 9\}$ → R.H.S.

L.H.S. = R.H.S.

Hence Proved.

5. If A and B are two such set such that $n(A \cup B) = 50$, $n(A) = 28$, $n(B) = 32$ $n(A \cap B)$.

⇒

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

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

$50 = 28 + 32 - n(A \cap B)$

$50 = 60 - n(A \cap B)$

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

(6) If $A = \{1, 2, 3\}$, $B = \{3, 4\}$ and $C = \{1, 3, 5\}$ find

(i) $A \times (B \cup C)$ (ii) $A \times (B \cap C)$ (iii) $(A \times B) \cap (A \times C)$

(i) $B \cup C = \{1, 3, 4, 5\}$

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

$\{1, 2, 3\} \times \{1, 3, 4, 5\} = \{(1,1), (1,3), (1,4), (1,5), (2,1), (2,3), (2,4), (2,5), (3,1), (3,3), (3,4), (3,5)\}$

(ii) $A \times (B \cap C) = \phi$

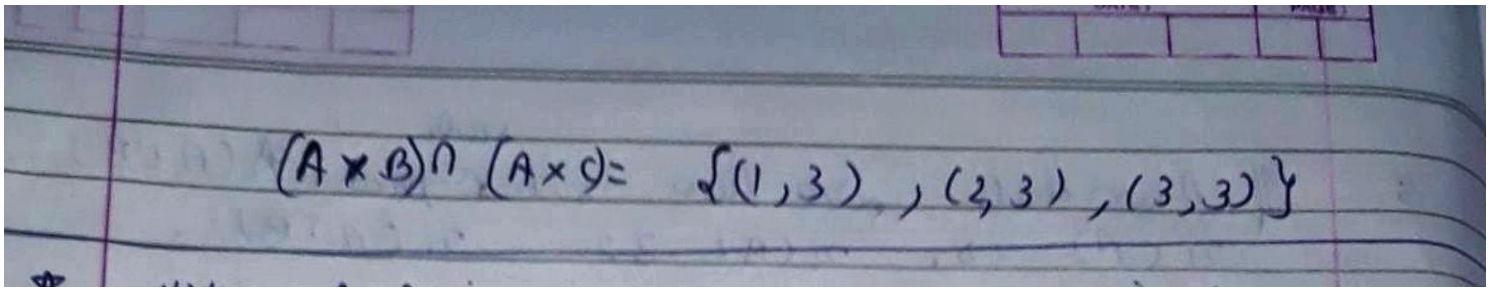
$B \cap C = \{3\}$

$A \times (B \cap C) = \{(1,3), (2,3), (3,3)\}$

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

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

$A \times C = \{(1,1), (1,3), (1,5), (2,1), (2,3), (2,5), (3,1), (3,3), (3,5)\}$


(A × B) ∩ (A × C) = {(1, 3), (2, 3), (3, 3)}