Tutorial 1

1.

(A). 4, 5, 6, 7, 8

(B). 2, 4, 6, 8, 10

(C). Null

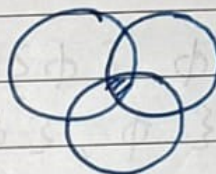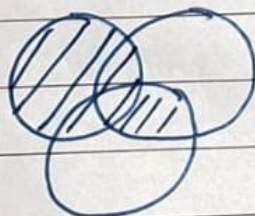**2)**

(A). Vowels

(B) Odd numbers less than 11

3).

(A).

(B).
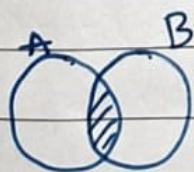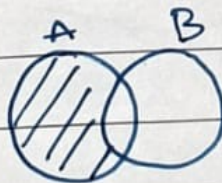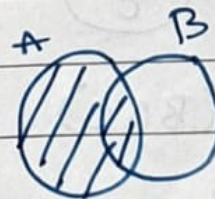
(C).

(D).

(E).

4).

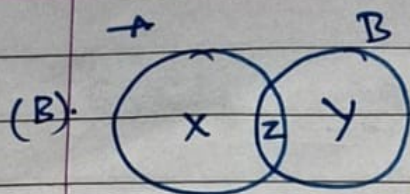(A).

$$\Rightarrow A = (A \cap B) \cup (A - B)$$

(B).

$|A \cup B| = X + Y - Z$

$|A| = X$, $|B| = Y$, $|A \cap B| = Z$

$\Rightarrow |A| + |B| - |A \cap B| = X + Y - Z$

$\Rightarrow |A \cup B| = |A| + |B| - |A \cap B|$

5). $2^n = 256$

$n = 8$

7). $P(\phi) = \{ \phi \}$

$P(P(\phi)) = \{ \phi, \{\phi\} \}$

$P(P(P(\phi))) = \{ \phi, \{\phi\}, \{\{\phi\}\}, \{ \phi, \{\phi\} \} \}$.

6). If A is a subset of B

$A \cup B = B$, $A \cap B = A$

8). $A \cap (B - C) =$

 $\rightarrow B - C$

$= $ $\rightarrow A \cap B - C$
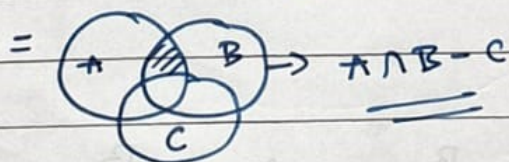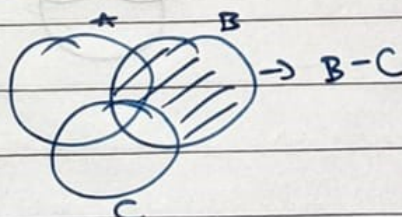
Now, $A - (B \cap C)$

 $\rightarrow A - (B \cap C)$
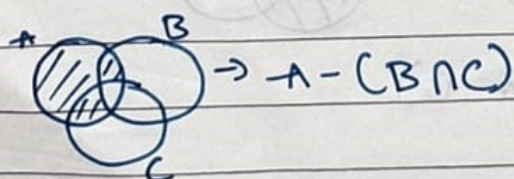
Elements of $A \cap B - C$ is subset of

$A - (B \cap C)$.

9 $T = 30$ $|TFCS| = |A| = 15$

$|AI| = |B| = 8$

$|\text{DBMS}| = |C| = C$

$|(A \cap B \cap C)| = 3$

no. of students with no subject,

$= 30 - |A \cup B \cup C| = 30 - |A| - |B| - |C| - |A \cap B| - |B \cap C| -$
$|A \cap C| - |A \cap B \cap C|$

$= 30 - 32 + \Sigma |A \cap B|$

$\Rightarrow \Sigma |A \cap B| - 2$

Now, ∵ no. of students in atleast 2 subjects,

$= -2 + 3 + 3 + 3$

$= 7$ Hence, proved

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10 (i). $A \times (B \cup C) = (A \times B) \cup (A \times C)$

$(x, y) \in A \times (B \cup C)$

$x \in A \;\&\; y \in (B \cup C)$

$x \in A \;\&\; (y \in B \;\text{or}\; y \in C)$

$(x \in A \;\&\; y \in B) \;\text{or}\; (x \in A \;\&\; y \in C)$

or $(x, y) \in (A \times B) \;\text{or}\; (x, y) \in (A \times C)$

$(x, y) \in (A \times B) \cup (A \times C)$

LHS = RHS

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

$(x, y) \in A \times (B \cap C)$

$x \in A \;\&\; y \in (B \cap C)$

$x \in A \;\&\; (y \in B \;\&\; y \in C)$

$(x \in A \;\&\; y \in B) \;\&\; (x \in A \;\&\; y \in C)$

$(x, y) \in (A \cap B) \;\&\; (x, y) \in (A \cap C)$

$(x, y) \in (A \cap B) \cap (A \cap C)$

$\Rightarrow$ LHS = RHS

11). $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10$

O = 101 0101010

E = 0101010101

Not) S, = 11 1111 00000

12). AUB = 1111101010

A∩B = 1010100 000

13) (A). $\{a\}$

(B). $\{a\}, \{b\}, \{a, b\}$

(C). $\{a\} \{b\} \{c\} \{a, b, c\} \quad \{a, b\} \{c, a\} \{b, c\}$

$\{a, c\} \{b\}$

14). $|P(x)| = 4 \quad |P \; P(x) \times P(x)| = 64$

$|P(P(x))| = 16$

15. Product = $\{(1, \phi), (2, \phi), (3, \phi), (1, \{a\}),$

$(2, \{a\}) \; 3, \{a\}\}$

$\dots$