Sets Ex 1.8 Q13

(i)

Let $n(P)$ denote total number of persons

$n(A)$ denote number of people who read magazine A

$n(B)$ denote number of people who read magazine B

and $n(C)$ denote number of people who read magazine C

Then, $n(P) = 100,\ n(A) = 28,\ n(B) = 30,\ n(C) = 42,\ n(A \cap B) = 8,$
$n(A \cap C) = 10, n(B \cap C) = 5,\ n(A \cap B \cap C) = 3$

Now,

$$n(A \cup B \cup C) = n(A) + n(B) + n(C) - n(A \cap B) - n(B \cap C) - n(A \cap C) + n(A \cap B \cap C)$$
$$= 28 + 30 + 42 - 8 - 10 - 5 + 3$$
$$= 100 - 23 + 3$$
$$= 100 - 20$$
$$= 80$$

$\therefore$ Number of people who read none of the three magazines
$$= n(A \cup B \cup C)'$$
$$= n(P) - n(A \cup B \cup C)$$
$$= 100 - 80$$
$$= 20$$

Hence, 20 people read none of the three magazines.

(ii)

$$n(C\ only) = 42 - (7 + 3 + 2)$$
$$= 42 - 12$$
$$= 30$$

Sets Ex 1.8 Q14

(i)

Let $n(P)$ denote total number of students

$n(E)$ denote number of students studying English language

$n(H)$ denote number of students studying Hindi language and

$n(S)$ denote number of students studying Sanskrit language

Then, $n(P) = 100,\ n(E - H) = 23,\ n(E \cap S) = 8,\ n(E) = 26,\ n(S) = 48,$

$n(S \cap H) = 8,\ n((E \cup H \cup S)') = 24$

Number of students studying English only = 18

We have,

$n((E \cup H \cup S)') = 24$

$\Rightarrow \quad n(P) - n(E \cup H \cup S) = 24$

$\Rightarrow \quad 100 - 24 = n(E \cup H \cup S)$

$\Rightarrow \quad n(E \cup H \cup S) = 76$

We have $n(E \cup H \cup S) = n(E) + n(H) + n(S) - n(E \cap H) - n(H \cap S) - n(E \cap S)$

$+n(E \cap H \cap S)$

$\Rightarrow \quad 76 = 26 + n(H) + 48 - 3 - 8 - 8 + 3$

$\Rightarrow \quad 76 = 26 + n(H) + 48 - 16$

$\Rightarrow \quad 76 = 26 + 32 + n(H)$

$\Rightarrow \quad n(H) = 76 - 58$

$= 18$

$\therefore$ 18 students were studying Hindi.

(ii)

From (i) we have $n(E \cap H) = 3$

$\therefore$ 3 students were studying both English and Hindi.

Sets Ex 1.8 Q15

Let $n(P_1)$ be the number of persons liking product P_1

$n(P_2)$ be the number of persons liking product P_2

and $n(P_3)$ be the number of persons liking product P_3

Then, $n(P_1) = 21,\ n(P_2) = 26,\ n(P_3) = 29,\ n(P_1 \cap P_2) = 14,$

$n(P_1 \cap P_3) = 12,\ n(P_2 \cap P_3) = 14,\ n(P_1 \cap P_2 \cap P_3) = 8$

$\therefore$ Number of people liking product P_3 only

$= 29 - (4 + 8 + 6)$

$= 29 - 18$

$= 11$

Hence, 11 persons liked product P_3 only.

********** END **********