



### 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,

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

$\therefore$  Number of people who read none of the three magazines

$$\begin{aligned} &= n(A \cup B \cup C)^c \\ &= n(P) - n(A \cup B \cup C) \\ &= 100 - 80 \\ &= 20 \end{aligned}$$

Hence, 20 people read none of the three magazines.

(ii)

$$\begin{aligned} n(C \text{ only}) &= 42 - (7 + 3 + 2) \\ &= 42 - 12 \\ &= 30 \end{aligned}$$

### 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

$$\begin{aligned}\text{Then, } n(P) &= 100, n(E \cup H) = 23, n(E \cap S) = 8, n(E) = 26, n(S) = 48, \\ n(S \cap H) &= 8, n((E \cup H \cup S)') = 24\end{aligned}$$

Number of students studying English only = 18

We have,

$$\begin{aligned}n((E \cup H \cup S)') &= 24 \\ \Rightarrow n(P) - n(E \cup H \cup S) &= 24 \\ \Rightarrow 100 - 24 &= n(E \cup H \cup S) \\ \Rightarrow n(E \cup H \cup S) &= 76\end{aligned}$$

$$\begin{aligned}\text{We have } n(E \cup H \cup S) &= n(E) + n(H) + n(S) - n(E \cap H) - n(H \cap S) - n(E \cap S) \\ &\quad + n(E \cap H \cap S)\end{aligned}$$

$$\begin{aligned}\Rightarrow 76 &= 26 + n(H) + 48 - 3 - 8 - 8 + 3 \\ \Rightarrow 76 &= 26 + n(H) + 48 - 16 \\ \Rightarrow 76 &= 26 + 32 + n(H) \\ \Rightarrow n(H) &= 76 - 58 \\ &= 18\end{aligned}$$

$\therefore$  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  $P_3$

$$\begin{aligned}\text{Then, } n(P_1) &= 21, n(P_2) = 26, n(P_3) = 29, n(P_1 \cap P_2) = 14, \\ n(P_1 \cap P_3) &= 12, n(P_2 \cap P_3) = 14, n(P_1 \cap P_2 \cap P_3) = 8\end{aligned}$$

$$\begin{aligned}\therefore \text{ Number of people liking product } P_3 \text{ only} \\ &= 29 - (4 + 8 + 6) \\ &= 29 - 18 \\ &= 11\end{aligned}$$

Hence, 11 persons liked product  $P_3$  only.

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