



Sets Ex 1.8 Q1

$n(A \cup B) = 50$ ,  $n(A) = 28$ ,  $n(B) = 32$ , where  $n(x)$  denotes the cardinal number of the set  $x$ .

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

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

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

$$\Rightarrow n(A \cap B) = 60 - 50 \\ = 10$$

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

Sets Ex 1.8 Q2

We have,

$$n(P) = 40, n(P \cup Q) = 60, n(P \cap Q) = 10, \text{ to find } n(Q).$$

We know  $n(P \cup Q) = n(P) + n(Q) - n(P \cap Q)$

$$\Rightarrow 60 = 40 + n(Q) - 10$$

$$\Rightarrow 60 = 30 + n(Q)$$

$$\Rightarrow n(Q) = 60 - 30 \\ = 30$$

Hence,  $Q$  has 30 elements.

Sets Ex 1.8 Q3

Let  $n(P)$  denote the number of teachers who teach Physics and

$n(Q)$  denote the number of teachers who teach Mathematics.

We have,

$$n(P \text{ or } M) = 20$$

$$\text{i.e. } n(P \cup M) = 20$$

$$n(M) = 12$$

$$\text{and } n(P \cap M) = 4$$

To find:  $n(P)$

We know  $n(P \cup M) = n(P) + n(M) - n(P \cap M)$

$$\Rightarrow 20 = n(P) + 12 - 4$$

$$\Rightarrow 20 = n(P) + 8$$

$$\Rightarrow n(P) = 20 - 8 \\ = 12$$

$\therefore$  There are 12 Physics teachers.

Sets Ex 1.8 Q4

Let,

$n(P)$  denote the total number of people

$n(C)$  denote the number of people who like coffee and

$n(T)$  denote the number of people who like tea.

Then,  $n(P) = 70$

$n(C) = 37$

$n(T) = 52$

We are given that each person likes at least one of the two drinks, i.e.,  $P = C \cup T$

To find:  $n(C \cap T)$

We know  $n(P) = n(C) + n(T) - n(C \cap T)$

$$\Rightarrow 70 = 37 + 52 - n(C \cap T)$$

$$\Rightarrow 70 = 89 - n(C \cap T)$$

$$\begin{aligned}\Rightarrow n(C \cap T) &= 89 - 70 \\ &= 19\end{aligned}$$

Hence, 19 people like both coffee and tea.

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