CBSE Class–11 Mathematics

NCERT Solutions

Chapter - 1 Sets

Exercise 1.6

1. If X and Y are two sets such that $n(X)=17, n(Y)=23$ and $n(X\cup Y)=38$, find $n(X$

Ans. Given: $n(X)=17, n(Y)=23$ and $n(X\cup Y)=38$

$\because n(X\cup Y)=n(X)+n(Y)-n(X\cap Y)$

$\therefore 38=17+23-n(X\cap Y)$

$\Rightarrow n(X\cap Y)=40-38=2$

2. If X and Y are two sets such that $X\cup Y$ has 18, X has 8 elements and Y has 15 elements; how many elements has $X\cap Y$?

Ans. Given: $n(X)=8, n(Y)=15$ and $n(X\cup Y)=18$

$\because n(X\cup Y)=n(X)+n(Y)-n(X\cap Y)$

$\therefore 18=8+15-n(X\cap Y)$

$\Rightarrow n(X\cap Y)=23-18=5$

3. In a group of 400 people, 250 can speak Hindi and 200 can speak English. How many people can speak both Hindi and English?

Ans. Let H be the set of people speaking Hindi and E be the set of people speaking English.

$\therefore n(H)=250, n(E)=200$ and $n(H\cup E)=400$

$\because n(H\cup E)=n(H)+n(E)-n(H\cap E)$

$\therefore 400=250+200-n(H\cap E)$

$\Rightarrow n(H \cap E) = 450 - 400 = 50$

4. If S and T are two sets such that S has 21 elements T has 32 elements and $S \cap T$ has 11 elements, how many elements does $S \cup T$ have?

Ans. Given: $n(S) = 21, n(T) = 32$ and $n(S \cap T) = 11$

$\because n(S \cup T) = n(S) + n(T) - n(S \cap T)$

$\therefore n(S \cup T) = 21 + 32 - 11 = 42$

5. If X and Y are two sets such that X has 40 elements, $X \cup Y$ has 60 elements and $X \cap Y$ has 10 elements, how many elements does Y have?

Ans. Given: $n(X) = 40, n(X \cap Y) = 10$ and $n(X \cup Y) = 60$

$\because n(X \cup Y) = n(X) + n(Y) - n(X \cap Y)$

$\therefore 60 = 40 + n(Y) - 10$

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

6. In a group of 70 people, 37 like coffee, 52 like tea and each person likes at least one of the two drinks. How many people like both coffee and tea?

Ans. Given: $n(C) = 37, n(T) = 52$ and $n(C \cup T) = 70$

$\because n(C \cup T) = n(C) + n(T) - n(C \cap T)$

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

$\Rightarrow n(C \cap T) = 89 - 70 = 19$

7. In a group of 65 people. 10 like both cricket and tennis. How many like tennis only and not cricket? How many like tennis?

Ans. Let C be the set of people who like cricket and T be the set of people who like tennis.

Then $n(C)=40, n(C\cap T)=10$ and $n(C\cup T)=65$

$\because n(C\cup T)=n(C)+n(T)-n(C\cap T)$

$\therefore 65=40+n(T)-10$

$\Rightarrow n(T)=65-30=35$

Therefore, number of people who like tennis are 35.

Now number of people who like tennis only and not cricket = $n(T-C)=n(T)-n(C\cap T)$

= 35 – 10 = 25

8. In a committee, 50 people speak French, 20 speak Spanish and 10 speak both Spanish and French. How many speak at least one of these two languages?

Ans. Let F be the set of people who speak French and S be the set of people who speak Spanish.

Then $n(F)=50, n(S)=20$ and $n(F\cap S)=10$

$\because n(F\cap S)=n(F)+n(S)-n(F\cap S)$

$\therefore n(F\cap S)=50+20-10=60$

Therefore, Number of people who speak at least one of these two languages are 60.