# NCERT Solutions for Class-XI Maths

## Chapter-1 Exercise-1.6

# NCERT Math Class 11

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

**1.** It is given that:

$n(X)=17, n(Y)=23, n(X\cup Y)=38$

$n(X\cap Y)=?$

We know that:

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

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

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

$\therefore n(X\cap Y)=2$



**2.** If X and Y are two sets such that X ∪ Y has 18 elements, X has 8 elements and Y has 15 elements; how many elements does X ∩ Y have?

**2.** Given-

n(X) = 8, n(Y) = 15, and n(X ∪ Y) = 18

We know that-

n(X ∪ Y) = n(X)+ n(Y) - n(X ∩ Y)

⇒ 18 = 8+15 - n(X ∩ Y)

⇒ 18 = 23 - n(X ∩ Y)

⇒ n(X ∩ Y) = 23-18

∴ n(X ∩ Y) = 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?

**3.** Let H be the set of people who speak Hindi, and E be the set of people who speak English

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

We know that: $n(H\cup E)=n(H)+n(E)-n(H\cap E)$

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

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

$\therefore n(H \cap E) = 50$

Thus, 50 people can speak both Hindi and English.

**4.** If S and T are two sets such that S has 21 elements, T has 32 elements, and S ∩ T has 11 elements, how many elements does S ∪ T have?

**4.** Given-

n(S) = 21, n(T) = 32, and n(S ∩ T) = 11

We know that-

n(S ∪ T) = n(S)+ n(T) - n(S ∩ T)

= 21+32 - 11

= 53 - 11

= 42

∴ n(S ∪ T) = 42

Thus, the no. of elements in n(S ∪ T) is 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?

**5.** It is given that: $n(X) = 40, n(X \cup Y)$

$= 60, n(X \cap Y) = 10$ We know that:

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

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

$\therefore n(Y) = 60 - (40 - 10) = 30$

Thus, the set $Y$ has 30 elements.

**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?

**6.** Let T be the set of people who like Tea,

and C be the set of people who like Coffee.

Number of people who like Tea = n(T) = 52

Number of people who like Coffee = n(C) = 37

Number of people who like at least tea or Coffee = n(T ∪ C ) = 70

Number of people who like both tea and Coffee = n(T ∩ C )

We know that-

n(T ∪ C) = n(T)+ n(C) - n(T ∩ C)

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

$\Rightarrow 70 = 89 - n(H \cap E)$

$\Rightarrow n(H \cap E) = 89-70$

$\therefore n(H \cap E) = 19$

Thus, 19 people like both Tea and Coffee.

**7.** In a group of 65 people, 40 like cricket, 10 like both cricket and tennis. How many like tennis only and not cricket? How many like tennis?

**7.** Let $C$ denote the set of people who like cricket, and $T$ denote the set of people who like tennis

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

We know that: $n(C \cup T) = n(C) + n(T) - n(C \cap T)$

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

$\Rightarrow 65 = 30 + n(T)$

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

Therefore, 35 people like tennis.

Now,

$(T - C) \cup (T \cap C) = T$

Also,

$(T - C) \cap (T \cap C) = \Phi$

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

$\Rightarrow 35 = n(T - C) + 10$

$\Rightarrow n(T - C) = 35 - 10 = 25$

Thus, 25 people like only tennis.

**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?

**8.** Let F be the set of people who speak French, and S be the set of people who speak Spanish.

Number of people who speak French = n(F) = 50

Number of people who speak Spanish = n(S) = 20

Number of people who can both speak French and Spanish

= n(F ∩ S)

= 10

Number of people who speak at least one of these two languages = n(F ∪ S)

We know that-
$n(F \cup S) = n(F) + n(S) - n(F \cap S)$
$= 50+20 - 10$
$= 60$
$\therefore n(H \cap E) = 60$
Thus, 60 people can speak at least one of French or Spanish.