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NCERT Class 11 Mathematics Solutions: Chapter 1 – Sets Miscellaneous Exercise Part 6

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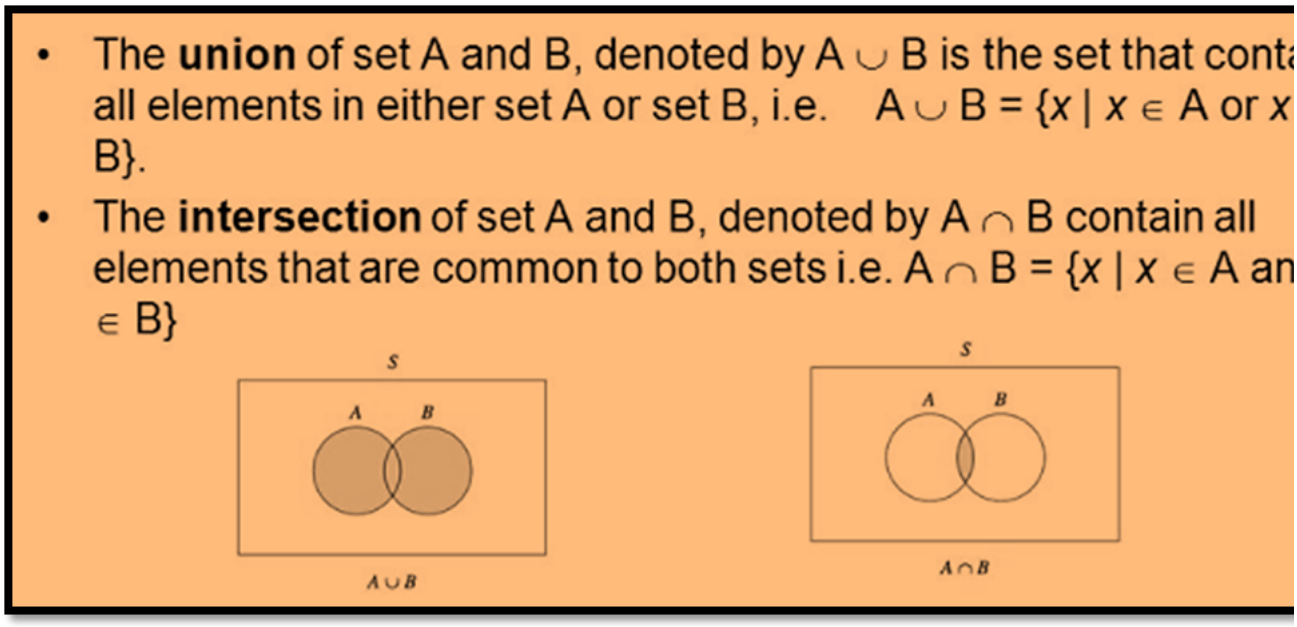


1. In a group of students 100 students know Hindi, 50 know English and 25 know both. Each of the students knows either Hindi or English. How many students are there in the group?

Answer:

Let U be the set of all students in the group.

Consider E be the set of all students who know English.

Consider H be the set of all students who know Hindi.

$\therefore H \cup E = U$

Accordingly, $n(H) = 100 \text{and} n(E) = 50$

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

$= 100 + 50 - 25$

$= 125$

So, there are 125 students in the group.

2. In a survey of 60 people, it was found that 25 people read newspaper $H, 26$ read newspaper $T, 26$ read newspaper $I, 9$ read both H and $I, 11$ read both H and $T, 8$ read both T and $I, 3$ read all three newspapers. Find:

(i) The number of people who read at least one of the newspapers.

(ii) The number of people who read exactly one newspaper.

Answer:

Consider A be the set of people who read newspaper H.

Consider B be the set of people who read newspaper T.

Consider C be the set of people who read newspaper .

Accordingly,

$$n(A) = 25, n(B) = 26, n(C) = 26, n(A \cap C) = 9, n(A \cap B) = 11,$$

$$n(B \cap C) = 8, n(A \cap B \cap C) = 3$$

Consider U be the set of people who took part in the survey.

Answer: (i)

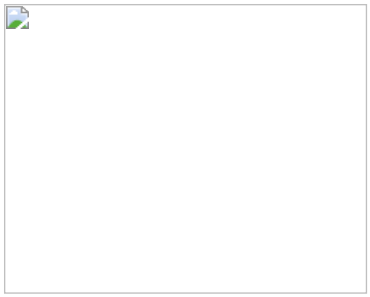
Accordingly,

$$n(A \cup B \cup C) = n(A) + n(B) + n(C) - n(A \cap B) - n(B \cap C) - n(C \cap A) + n(A \cap B \cap C)$$

$$= 25 + 26 + 26 - 11 - 8 - 9 + 3 = 52$$

So, 52 people read at least one of the newspapers.

Answer: (ii)



Consider be the number of people who read newspapers H and T only.

Consider denote the number of people who read newspapers I and H only.

Consider denote the number of people who read newspapers T and I only.

Consider denote the number of people who read all three newspapers.

Accordingly, $d = n(A \cap B \cap C) = 3$

Now,

$$n(A \cap B) = a + d$$

$$n(B \cap C) = c + d$$

$$n(C \cap A) = b + d$$

$$\therefore a + d + c + d + b + d = 11 + 8 + 9 = 28$$

$$\Rightarrow a + b + c + d = 28 - 2d = 28 - 6 = 22$$

Hence, $(52 - 22) = 30$ people read exactly one newspaper.