

Que 4: in a survey of 400 students in a school, 100 were listed as taking apple juice, 150 as taking orange juice and 75 were listed as taking both apple as well as orange juice. Find how many student were taking neither apple juice nor orange juice.

Solution:-

let U :- set of surveyed student
 A :- set of student taking apple.
 B :- set of student taking orange juice.

then

$$n(U) = 400, \quad n(A) = 100, \quad n(B) = 150 \quad \text{and} \\ n(A \cap B) = 75$$

$$\begin{aligned} \text{now } n(A' \cap B') &= n(A \cup B)' \\ &= n(U) - n(A \cup B) \\ &= n(U) - n(A) - n(B) + n(A \cap B) \\ &= 400 - 100 - 150 + 75 = 225 \end{aligned}$$

so 225 students were taking neither apple juice nor orange juice.