Q2 An investigator interviewed 100 students to determine preference for three drinks: $\operatorname{Milk}(\mathrm{M})$, Coffee(C), Tea(T). He reported the following: 10 students had all the three drinks M,C,T; 20 had M\&C: 30 had C\&T; 25 had $\mathrm{M} \& \mathrm{~T} ; 12$ had M only; 5 had C only; 8 had T only. Enumerate how many did not take any of the drink.

## Solution

$N_{M}$ is the number of students who had $\operatorname{Milk}(\mathrm{M})$ only;
$N_{T}$ is the number of students who had Tea(T) only;
$N_{C}$ is the number of students who had Coffee(C) only;
$N_{M C}$ is the number of students who had $\operatorname{Milk}(\mathrm{M}) \& \operatorname{Coffee}(\mathrm{C})$ but no Tea(T);
$N_{M T}$ is the number of students who had $\operatorname{Milk}(\mathrm{M}) \& T e a(T)$ but no Coffee(C);
$N_{T C}$ is the number of students who had Tea(T)\&Coffee(C) but no Milk(M);
$N_{M C T}$ is the number of students who had all the three drinks $\operatorname{Milk}(\mathrm{M}), \operatorname{Coffee}(\mathrm{C}), \mathrm{Tea}(\mathrm{T})$.
To find the number of students who did not take any of the drink we have to take away students who take any of the drink from 100 students.

Students who take any of the drink:
$N_{M}=12, N_{C}=5, N_{T}=8$.
$N_{M C T}=10$.
$N_{M C}=20-N_{M C T}=20-10=10$.
$N_{M T}=25-N_{M C T}=25-10=15$.
$N_{T C}=30-N_{M C T}=30-10=20$.
Number of students who take any of the drink $=N_{M}+N_{C}+N_{T}+N_{M C}+N_{M T}+N_{T C}+N_{M C T}=$

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=12+5+8+10+15+20+10=80
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Number of students who did not take any of the drink $=100-80=20$.

## Answer: 20.

