Probability & Statistical Modeling

Quiz - 1

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Question no. 1

Let p(U) be the total number of newspaper subscribers last year. Similarly, let p(Yes) be the probability of subscribers with traded stocks and p(No) be the probability of subscribers without traded stocks.

Similarly, let p(R), p(O) and p(N) be the probability of subscribers who read business section regularly, occasionally and never respectively.

From the data, we have,

p(U) = 9+5+2+8+16+10 = 50

a. Ans.

8/25 = **0.32**

b. Ans.

Probability of subscriber that never read business section and had not traded stock is

(12/50) * (34/50)

= **0.1632**

c. Ans.

Probability that subscriber regularly read business section, given that he/she traded stock

= 9 / 17

0.5294

d. Ans

Probability that subscriber occasionally read business section or never had trade stock is,

(21/50) + (34/50) - (16/50)

= 39 / 50

= **0.78**

e. Ans

To be independent, equation $p(R) \cap p(N) = p(R) * p(N)$ should be true.

This does not holds true in our case, so they are **not statistically independent.**

Question no. 2

Ans

Let, n(U) be the total number of enrolled students in first year of college. Likewise, n(R), n(H) and n(T) be the number of college students who joined Rugby, Hockey and Tennis club respectively.

From provided data,

$n(U) = 110$

$n(R) = 37$

$n(H) = 48$

$n(T) = 45$

$n(R \cap H) = 15$

$n(H \cap T) = 13$

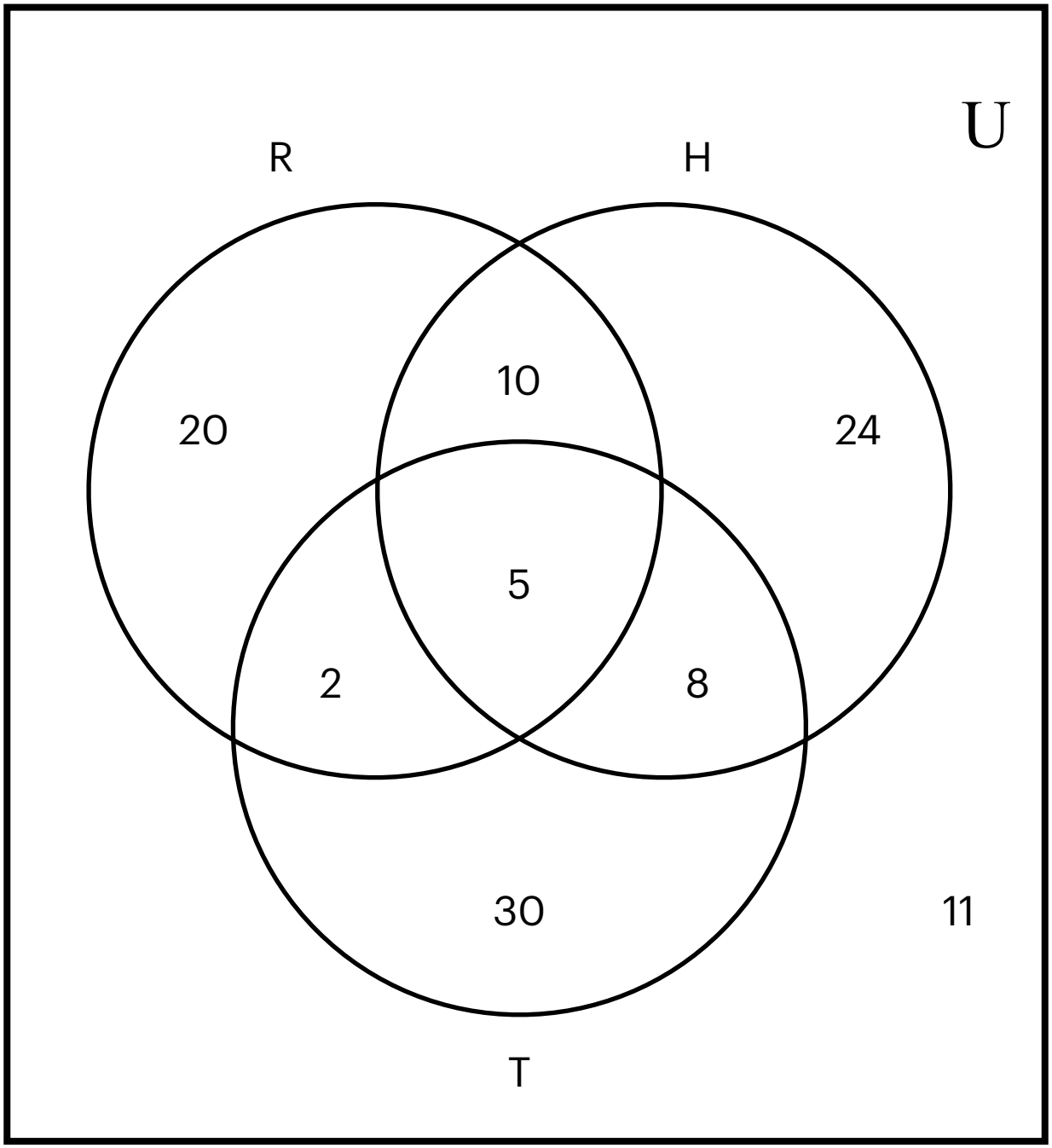
$n(R \cap T) = 7$

$n(R \cap H \cap T) = 5$

Now,

a. Ans

Representation of information in Venn-diagram is demonstrated below :



b. Ans

$n(R \cup H \cup T)' = n(U) - n(R \cup H \cup T)$

$= 100 - n\{n(R)+n(H)+n(T)-n(R \cap H) - n(H \cap T) - n(R \cap T) + n(R \cap H \cap T)\}$

$= 110 - (37 + 48 + 45 - 15 - 13 - 7 + 5)$

$= 110 - 100$

$= \mathbf{10}$

Therefore, total number of students who did not joined any clubs are 10.

Then,

Percentage of students who did not joined any clubs are :

$(10 / 110)* 100$

$= \mathbf{9.09\%}$

i.e, 9.09% of students did not joined any clubs.

c. Ans

Number of students who joined at least one club are

$n(R \cup H \cup T)$

i.e, 100

So, Percentage of students who joined at least one club are:

$(100 / 110)* 100$

$= \mathbf{90.90\%}$

d. Ans

Number of students who joined only one club ,

{ N only (R) + n only(H) + n only(T) / 110} * 100

= (75 / 110)* 100

= 68.18 %