Assessment_2 - One Neuron -Tech Neuron- Statistics Assessments

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1.An urn contains 4 tickets numbered 1, 2, 3, 4 and another contains 6 tickets numbered 2, 6, 7, 8, 9. If one of the two urns is chosen at random and a ticket is drawn at random from a chosen urn, find the probabilities that the ticket drawn bears

a. 2 or 4
b. 3
c. 1 or 9

Sol:

Let's

consider Bag A contains = 4 tickets

consider Bag B contains =6 tickets

Probability of choosing the Bag = ½

a. The probabilities that the ticket drawn 2 or 4 = ½ [1/4+1/6] = 10/48 =5/24
b. The probabilities that the ticket drawn 3 is = ½[1/4+0] = 1/8
c. The probabilities that the ticket drawn 1 or 9 = ½[1/4+1/6] =10/48 =5/25

2.A box contains 6 red, 4 white and 5 black balls. A person draws 4 balls at random from the box at random.j Find the probability that among the balls drawn there is at least one ball of each colour.

Sol :

(2) Let

A = atleast one of the ball of each color

$\bar{A}$ = Red, White, Black

$P(\bar{A})$ = total possible outcomes

$P(A) = 1 - P(\bar{A})$

Rsb atleast one ball of each colour

total possibility = $15C_4$

$P(\bar{A}) = \frac{9C_4 + 10C_4 + 11C_4}{15C_4}$

$P(A) = 1 - P(\bar{A}) = 1 - \frac{9C_4 + 10C_4 + 11C_4}{15C_4}$

3.The odds that a book on statistics will be favourably reviewed by 3 independent critics are 3 to 2, 4 to 3 and 2 to 3 respectively.What is the probabilities that the reviews:

a. All will be favourable
b. Majority of the reviews will be favourable
c. Exactly one review will be favourable
d. Exactly two reviews will be favourable
e. At Least one of the reviews will be favourable

Sol :

③ Let P_1, P_2, P_3 Prob of favorable reviews

Let $\bar{P}_1, \bar{P}_2, \bar{P}_3$ " " non "

Three critics are $3 \to 2$, $4 \to 3$, $2 \to 3$

$P_1 = \frac{3}{5}$; $\bar{P}_1 = \frac{2}{5}$

$P_2 = \frac{4}{7}$; $\bar{P}_2 = \frac{3}{7}$

$P_3 = \frac{2}{5}$; $\bar{P}_3 = \frac{1}{3}$

④ Prob of all favorable $= P_1 \times P_2 \times P_3$

$= \frac{3}{5} \times \frac{4}{7} \times \frac{3}{5} = \frac{24}{175}$

⑤ at least two favorable =

$P(P_1, P_2, \bar{P}_3) + P(P_1 P_3 \bar{P}_2) + P(P_2 P_3 \bar{P}_1)$

$= \left(\frac{3}{5} \times \frac{4}{7} \times \frac{1}{3}\right) + \frac{3}{4} \times \frac{2}{5} \times \frac{3}{7} + \left(\frac{4}{7} \times \frac{2}{5} \times \frac{2}{5}\right)$

① at least one favorable =

$= P(P_1 \bar{P}_2 \bar{P}_3) + P(P_2 \bar{P}_1 \bar{P}_3) + P(P_3 \bar{P}_1 \bar{P}_2)$

$= \left(\frac{3}{5} \times \frac{3}{7} \times \frac{1}{3}\right) + \frac{4}{7} \times \frac{2}{5} \times \frac{1}{3} + \left(\frac{2}{5} \times \frac{2}{5} \times \frac{3}{5}\right)$

② majority =

$P(P_1 P_2 \bar{P}_3) + P(P_2 P_3 \bar{P}_2) + P(P_2 P_3 \bar{P}_1) + P(P_1 P_2 P_3)$

$= \left(\frac{3}{5} \times \frac{4}{7} \times \frac{1}{3}\right) + \frac{3}{4} \times \frac{2}{5} \times \frac{3}{7} + \left(\frac{4}{7} \times \frac{2}{5} \times \frac{2}{5}\right) + \frac{3}{5} \times \frac{4}{7} \times \frac{2}{5}$