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1- $^{n}C_{r} = n!$

$n = 12 \qquad r = 4$

$^{12}C_{4} = 12! \qquad 4!(12-4)! = 495$

$^{8}C_{4} = 8! \qquad 4!(8-4)! = 70$

$^{4}C_{4} = 1$

$495 \times 70 \times 1 = 34650$

3)

i- $P(A) = \frac{4}{12} \times \frac{3}{11} = \frac{1}{3} \times \frac{3}{11} = \frac{1}{11}$

$P(B) = \frac{2}{3} \times \frac{8}{11} = \frac{16}{33}$

ii- P(both are non-defective)

$= \frac{2}{3} \times \frac{7}{11} = \frac{14}{33}$

P(at least one is defective)

$= 1 - \frac{14}{33} = \frac{19}{33}$.

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4-

i- the probaility That one of the three selected items is defective.

$= 120 \times 455 = 54600$

ii- ${}^5C_1 \times {}^{10}C_2 = 5 \times \{10! / 2! (10-2)!\} = 5 \times 45 = 255$

iii- the probalility that at Leastone item of three is defeltive

$= 1 - \frac{24}{91} = \frac{67}{91}$.

5)

$P(A) = \frac{10}{30} = \frac{1}{3}$ $P(B) = \frac{(5+10)}{30}$

$= \frac{1}{2}$

boys form Mansoura $= \frac{10}{2} = 5$

$P(A \text{ and } B) = \frac{5}{30} = \frac{1}{6}$

$P(A \text{ or } B) = \frac{1}{3} + \frac{1}{2} - \frac{1}{6} = \cancel{\frac{4}{6}}\ \frac{2}{3}$

6-

i- $P(\bar{A}) = 1 - \frac{3}{8} = \frac{5}{8}$

ii- $P(\bar{B}) = 1 - \frac{1}{2} = \frac{1}{2}$

iii- $P(\bar{A} \cap \bar{B}) = P(\overline{A \cup B}) = 1 - \left(\frac{3}{8} + \frac{1}{2} - \frac{1}{2}\right) = \frac{1}{8}$

iv- $P(\bar{A} \cup \bar{B}) = P(\overline{A \cap B}) = 1 - \frac{1}{2} = \frac{1}{2}$.

v)- $P(\bar{A} \cap B) = P(\bar{B}) - P(A \cap B) = \frac{1}{2} - \frac{1}{2} = 0$

vii- $P(B \cap \bar{A}) = P(B) - P(A \cap B)$ $\frac{1}{2} - \frac{1}{2} = 0$

7-

the Probability of not rolling a sum of 7 on any of the three rolls is

$\left(\frac{5}{6}\right)^3 = \frac{125}{216}$

the Probability of dice three Times is

$1 - \frac{125}{216} = \frac{91}{216}$

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8-

$\sum P(X) = K^2 - 8$

$\sum P(X) = 1 \qquad 1 = K^2 - 8$

$K^2 = 8 + 1$

$K^2 = 9$

$K = \pm 3$

$K = 3$

9-

mutually exclusive

$P(A \cap B) = \text{zero}$

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

$= 1 - 0 = 1$

$\underline{1}$