التاريخ :   الموضوع :

1- ${}^{n}C_{r} = n! / r!(n-r)!$

$n = 12 \quad r = 4$

$^{12}C_{r} = 12! / 4!(12-4)! = 495$

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

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

$= 495 \times 70 \times 1 = 34,650$

التاريخ : الموضوع :

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

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

$\boxed{2}$ p(both are non-defective)

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

p(at least one is defective)

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

4 - ${}^{10}C_3 = 10! / 3!(10-3)! = 120$

① The probability that one of the three selected items is defective =

$120 \times 455 = 24/91$

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

$= 5 \times 45 = 225$

③ The probability That at least one item of Three is defective =

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

5- $P(A) = \frac{10}{30} = \frac{1}{3}$, $P(B) = \frac{(5+10)}{30} = \frac{1}{2}$

Number of boys from Mansoura $= \frac{10}{2} = 5$

$P(A \text{ and } B) = \frac{5}{30} = \frac{1}{6}$, $P(A \text{ or } B) = \frac{1}{3} + \frac{1}{2} - \frac{1}{6}$
$= \frac{5}{6}$

6-

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

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

(iii) $P(A^c \cap B^c) = P(A \cup B)' = 1 - P(A \cup B) =$
$1 - P(A) + P(B) =$
$1 - ((\frac{3}{8} + \frac{1}{2}) - \frac{1}{2}) = \frac{1}{8}$

(iv) $P(A^c \cup B^c) = P(A \cup B)' = 1 - P(A \cap B)$
$= 1 - \frac{1}{2} = \frac{1}{2}$

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

(vi) $P(B \cap A^c) = P(B) - P(A \cap B) = \frac{1}{2} - \frac{1}{2} = 0$

التاريخ : الموضوع :

7 _ The probability of not falling 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 $1 - \frac{125}{216} = \frac{91}{216}$

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

$\sum P(X) = 1$ $\quad$ $1 = k^2 - 8$

$k^2 = 9 \Rightarrow k = \pm 3 \Rightarrow k = 3$

9 _ mutually exclusive, $p(A \cap B) = 0$

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

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

$\therefore P(\bar{A} \cap \bar{B}) = 1 - 0 = 1$