C. Charumathi
19BCS4018

# IMARTICUS STATISTICS ASSESMENT

1) Cards = 52

Diamond = 13

Heart = 13

Spade = 13

$$\text{Required probability} = \frac{{}^{13}C_1 \times {}^{13}C_1 \times {}^{13}C_1}{{}^{52}C_3}$$

$$= \frac{13 \times 13 \times 13}{52 \times 51 \times 50}$$

$$= 2197/138600 = 169/10200$$

$$= 0.0165$$

2) Action movies = 40% → P(A)

Comedy movies = 54% → P(B)

Drama movies = 36% → P(C)

Horror movies = 12% → P(D)

a) Either action or drama.

$$P(A \cup C) = P(A) + P(C) - P(A \cap C)$$

$$= 42 + 36 - 0$$

$$P(A \cup C) = 78/100$$

b) either comedy or horror

$$P(B \cup D) = P(B) + P(D) - P(B \cap D)$$

$$= 54 + 12 - 0$$

$$P(B \cup D) = 66/100$$

3)

| Bag A | Bag B |
|---|---|
| Red - 3 | White - 4 |
| Black - 5 | Black - 7 |

$P(A) = 1/2$ , $P(B) = 1/2$

$P\left(\frac{\text{Black}}{A}\right) = 5/8$ , $P\left(\frac{\text{Black}}{B}\right) = 7/11$

$$P\left(\frac{B}{\text{Black}}\right) = \frac{P(B) \times P\left(\frac{\text{Black}}{B}\right)}{P(A) \times P\left(\frac{\text{Black}}{A}\right) + P(B) \times P\left(\frac{\text{Black}}{B}\right)}$$

$$= \frac{1/2 \times 7/11}{[1/2 \times 5/8] + [1/2 \times 7/11]}$$

$$= \frac{7/22}{\frac{5}{16} + \frac{7}{22}} = \frac{\frac{7}{22}}{\frac{110+112}{352}}$$

$$= \frac{7/22}{\frac{222}{352}} = 7/22 \times \frac{352}{222}$$

$$= \frac{2464}{4884} = 0.5045$$

$P(B/\text{Black}) = 0.5045$

6) $z = \frac{x - \mu}{\sigma}$

$0.675 = \frac{x - 350870}{18405}$

$x = 350870 + (0.675 \times 18405)$

$x = 359837.045$

$75^{th}$ percentile $= 359837.045$

4) Given:

450 Applications in 1 hour.

By poisson Distribution,

a) $\lambda = \frac{450}{60}^{15}$

$\boxed{\lambda = 15/2}$, $\boxed{x = 10}$

$P(X=10) = \frac{e^{-15/2} \cdot (15/2)^{10}}{10!}$

$= 0.0858$

b) $\lambda = \frac{450}{120}^{15}$

$\lambda = 15/4$, $x = 17$

$P(X=17) = \frac{e^{-15/4} \cdot (15/4)^{17}}{17!}$

$= 0.6321$