

Smarticus Statistics
Assessment

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- 1) Cards = 52
Diamond = 13
Heart = 13
Spade = 13

$$\begin{aligned}\text{Probability} &= \frac{13C1 \times 13C1 \times 13C1}{52C3} \\ &= \frac{13 \times 13 \times 13}{52 \times 51 \times 50} \\ &= \frac{2197}{132600} = \frac{169}{10200} \\ &= 0.0165\end{aligned}$$

- 2) Action movies = 42%
Comedy movies = 54%
Drama movies = 36%
Horror movies = 12%

a) Either (Action or Drama)

$$\begin{aligned}&= P(\text{Action}) + P(\text{Drama}) - P(\text{Action} + \text{Drama}) \\ &= 42 + 36 - 0 \\ &= 78/100 \\ &= 0.78\end{aligned}$$

$$\begin{aligned}
 b) P(\text{either comedy or horror}) \\
 &= P(\text{comedy}) + P(\text{horror}) - P(\text{comedy \& horror}) \\
 &= 54 + 12 - 0 \\
 &= 66/100 = 0.66
 \end{aligned}$$

$$\begin{aligned}
 3) \text{ Bag A} &= 3 \text{ red} & \text{Bag B} &= 4 \text{ white} \\
 &5 \text{ black} & &7 \text{ black}
 \end{aligned}$$

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

$$P(\text{Black} | A) = 5/8, \quad P(\text{Black} | B) = 7/11$$

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

$$= \frac{1/2 \times 7/11}{\left[\left(1/2\right) \times \left(5/8\right)\right] + \left[1/2 \times 7/11\right]} = \frac{7/22}{5/16 + 7/22}$$

$$= \frac{7}{22} \times \left[\frac{352}{110 + 112} \right] = \frac{7}{22} \times \frac{352}{222} = \frac{2464}{4884}$$

Probability of Bag B is 0.5045

$$b) Z = \frac{x - \mu}{\sigma}$$

$$0.675 = \frac{x - 350870}{12405}$$

$$x = 350870 + (0.675 \times 12405)$$

$$x = 359237.045$$

$$75^{\text{th}} \text{ percentile} = 359237.045$$

4)

450 Application in 1 hour

The given problem belongs to Poisson distribution

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

$$\lambda = 15/2, n = 10$$

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

$$= 0.0858$$

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

$$=$$