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Statistics Answers

1) Total no. of cards = 52

$$n(S) = {}^{52}C_3 = \frac{52 \times 51 \times 50}{3 \times 2 \times 1} = 88400$$

$$E = {}^{13}C_1 \times {}^{13}C_1 \times {}^{13}C_1$$

$$= 13 \times 13 \times 13$$

$$= 2197$$

$$P(E) = \frac{n(E)}{n(S)} = \frac{2197}{88400} = \frac{169}{6800}$$

2) Repondents ~~said~~ like Action movies = 42 % $\rightarrow P(A)$

Repondents like comedy movies = 54 % $\rightarrow P(B)$

Repondents like Drama movies = 36 % $\rightarrow P(C)$

Repondents like Horror movies = 12 % $\rightarrow P(D)$

a) Like either action or drama.

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

$$= 42 + 36 - 0$$

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

b) Like either comedy or horror.

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

$$= 54 + 12 - 0$$

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

3)

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

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

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

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

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

$$= \frac{7/22}{\frac{5}{16} + \frac{7}{22}} = \frac{\frac{7}{22}}{\frac{110+112}{352}} = \frac{7/22}{\frac{222}{352}} = \frac{7}{22} \times \frac{352}{222}.$$

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

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

4) Given,

450 applications in 1 hour.

By poisson distribution.

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

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

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

$$= 0.0858$$

b) $$P(X = x) = \frac{e^{-15/2} \cdot (15/2)^{17}}{17!}$$

$$= 0.6321$$

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

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

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

$$x = 359237.045$$

75 th percentile = 359237.045.