Data Science.

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19BECH151

1.

$$n(s) = {}^{52}C_3 = \frac{52 \times 51 \times 50}{3 \times 2 \times 1} = 88,400$$

$$n(E) = {}^{13}C_1 \times {}^{13}C_1 \times {}^{13}C_1$$

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

$$= 2197$$

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

2)

Action movies $= 42\% \rightarrow P(A)$

Comedy movies $= 54\% \rightarrow P(B)$

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

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

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

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

$P(Black/A) = 5/8$, $P(Black/B) = 7/11$

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

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

$$= \frac{7/22}{5/16 + 7/22} = \frac{7/22}{\frac{110 + 12}{352}}$$

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

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

$P(B/Black) = 0.5045$

4)

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

$\lambda = 15/2 \quad , \quad x = 10$

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

$= 0.0858$

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

$= 0.6321$

6)

$Z = \dfrac{x-\mu}{\sigma}$

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

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

$x = 359237.045$

75th percentile $= 359237.045$