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1. Cards : 52

Diamond = 13

Heart = 13

Spade = 13

Required Probability: $\frac{13C_1 \times 13C_1 \times 13C_1}{52C_3}$

$= \frac{13 \times 13 \times 13}{52 \times 51 \times 50} = \frac{2197}{132600}$

$= 0.0165$

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

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

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

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

$$= \frac{1/2 \times 7/11}{(1/2 \times 5/8) + (1/2 \times 7/11)}$$

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

$P\left(\frac{B}{Black}\right) = 0.5045$

6. $z = \frac{x - H}{\sigma}$

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

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

$x = 359237.045$

75th Percentile $= 359237.045$

(4) a)

450 applications in 1 hour

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

$\lambda = 15/2$.

$x = 10$

$P(x=7) = \frac{e^{-15/2} \cdot (15/2)^{10}}{10!}$

$= 0.0858$

b)

$P(x=x) = \frac{e^{-15/2} \cdot (15/4)^{17}}{17!}$

$= 0.6824.$