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1) Cards = 52

Diamond = 13

Heart = 13

$$P = \frac{{}^{13}C_1 \times {}^{13}C_1 \times {}^{13}C_1}{{}^{52}C_3}$$

$$= \frac{13 \times 13 \times 13}{52 \times 51 \times 50} = \frac{2197}{132600} = \frac{169}{10200}$$

$$P = 0.0165$$

2) Action movies = 42%

Comedy movies = 54%

Drama movies = 36%

Horror movies = 12%

T = 144%

P(Action or drama) = P(action) + P(drama) - P(Action + drama)

$$= \frac{42}{144} + \frac{36}{144} = 42 + 36 - 0$$

$$= \frac{78}{144} = 78/100$$

$$= 0.78$$

$$= 0.5416$$

b) P (either comedy or horror)

= P(comedy) + P(horror) - P(comedy & horror)

= 54 + 12 - 0

= 66 / 100 = 0.66

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

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

P (Black / B) = 7/11

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

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

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

= 7/22 / 222/352

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

$= \frac{2464}{4884}$

= 0.5045

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

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

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

$x = 359237.045$

75^{th} = 359237.045 percentile

4) By poisson destribution:

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

$\lambda = \frac{15}{2}$, $x = 10$

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

$= 0.0858$

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

$= 0.6321$