1) Cards = 52

Diamond = 13

Heart = 13

Spade = 13

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

$$= \frac{2197}{132600}$$

$$= 0.016568271$$

2) $P(A) = 48$

$P(C) = 54$

$P(D) = 36$

$P(H) = 12$

a) either action or drama

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

$$= 48 + 36 - 0$$

$$P(A \cup D) = 78/100$$

b) either comedy or horror

$$P(B \cup h) = P(c) + P(h) - P(c \cap h)$$

$$= 54 + 12 - 0$$

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

3) Bag A

Red - 3

Black - 5

Bag B

White - 4

Black - 7

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

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

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

$$= \frac{1/2 \times 7/10}{\left[1/2 \times 5/8\right] + \left[1/2 \times 7/11\right]}$$

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

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

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

$P(B|\text{Black}) = 0.5045$

④ Given

450 Application in 1 hour

By poisson Distribution

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

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

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

$= 0.0858$

b) $\lambda = \frac{450}{120}$

$\lambda = 15/4$, $x = 17$

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

$= 0.6321$

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

$0.675 = \frac{x - 350870}{18405}$

$x = 350870 + (0.675 \times 18405)$

$x = 359237.045$

75th percentile = 359237.045.