

1)

$$\text{Total} = 52$$

$P(\text{card is diamond, one card is heart and one is spade})$

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

$$= 0.0165$$

2)

$$\text{action} = 42\%$$

$$\text{comedy} = 54\%$$

$$\text{drama} = 36\%$$

$$\text{horror} = 12\%$$

$$\text{i) either action or drama} = \frac{42}{100} + \frac{36}{100}$$

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

$$\text{ii) either comedy or horror}$$

$$= \frac{54}{100} + \frac{12}{100} = \frac{66}{100}$$

3)

A	B
3R	4W
B5	1B

$$P\left(\frac{\text{Black}}{A}\right) = \frac{5}{8} \quad P\left(\frac{\text{Black}}{B}\right) = \frac{1}{11}$$

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

$$= \frac{1}{2} \times \frac{7}{11}$$

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

$$= \frac{7}{22}$$

$$0.318$$

$$= 0.505$$

$$\mu = 350870$$

$$\sigma = 12405$$

$$z = 75 \Rightarrow 0.675$$

$$\text{percentile} = 350870 + (0.675 \times 12405)$$

$$= 359,243.375$$