

Problem Set - 4

i) with replacement

Total number of balls = 10
 # white balls = 4
 # black balls = 6

$P(\text{Pick 3 balls among 5 are white})$

$P(\text{Pick 3 balls out of 5 without replacement \& order does not matter})$ AND

$P(\text{Pick 3 balls out of 4 with replacement \& order matters})$ AND

$P(\text{Pick 2 black balls out of 6 with replacement \& order matters})$

$$= {}^5C_3 \times \left(\frac{4}{10} \times \frac{4}{10} \times \frac{4}{10} \right) \times \left(\frac{6}{10} \times \frac{6}{10} \right)$$

$$= {}^5C_3 \times \left(\frac{4}{10} \right)^3 \times \left(\frac{6}{10} \right)^2$$

ii) with Replacement

(Hyper Geometric experiment)

Total number of balls = 10 (N)

Total number of white balls = 4 (k)

Total number of picking balls = 5 (n)

Total number of picking balls = 5 (n)

total number of white balls drawn = 3

$$= \frac{{}^k C_k \cdot {}^{n-k} C_{n-k}}{{}^n C_n}$$

$$= \frac{{}^4 C_3 \cdot {}^{10-4} C_{5-3}}{{}^{10} C_5}$$

$$= \underline{\underline{23.81\%}}$$