

Session 16 Assignment 1

Prob 1:- $n=20$; $r=5$

Probability of success, $p = \frac{1}{4}$

" " failure, $q = 1-p = 1 - \frac{1}{4} = \frac{3}{4}$

Binomial Distribution

$$P = {}^{20}C_5 \left(\frac{1}{4}\right)^5 \left(\frac{3}{4}\right)^{15}$$
$$= \frac{20!}{5!(20-5)!} (0.25)^5 (0.75)^{15}$$
$$= 15504 (0.25)^5 (0.75)^{15}$$
$$P = 3.4265 \times 10^{-6} //$$

Prob 2:- $n=50$; $r=5$

$$P = {}^nC_r p^r (1-p)^{n-r} = {}^{50}C_5 p^5 (1-p)^{50-5}$$

Probability of success, $p = \frac{1}{5}$

" " failure, $q = 1-p = 1 - \frac{1}{5} = \frac{4}{5}$

$$P = \frac{50!}{5!(40-5)!} \left[\frac{1}{5}\right]^5 \left[\frac{4}{5}\right]^{45}$$

$$P = 0.0295 //$$

Prob 3:- 4 Red balls & 6 Black balls.

Total no. of balls, $n = 6+4 = 10$

Probability of ~~only~~ red balls = $\frac{4}{10} = 0.4$

" " Black " = $\frac{6}{10} = 0.6$

Possible outcomes = RR, RB, BR, BB (w/o replacement)

if ~~there are~~ no. of balls.

RR $P(RR) = \frac{4}{10} \cdot \frac{3}{9} = 0.134$

RB $P(RB) = \frac{4}{10} \cdot \frac{6}{9} = 0.267$

BR $P(BR) = \frac{6}{10} \cdot \frac{4}{9} = 0.267$

BB $P(BB) = \frac{6}{10} \cdot \frac{5}{9} = 0.334$