

PROBABILITY PROBLEMS

Let's say we have a box with 10 socks, 4 of them white and 6 black, and we want to choose 3 socks from the 10, without replacement. What is the probability of choosing exactly two white?

Solution: We will call $N=10$, $n=3$

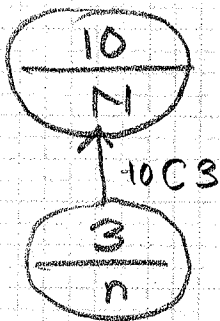
white 4 = r
 Black 6 = N-r
 total 10 = N

$$P(A) = \frac{\# \text{ in favor}}{\# \text{ total}} = \frac{n(A)}{n(S)}$$

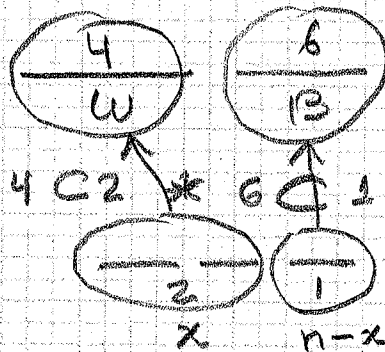
A = the set of all sets of 3 socks in which two are white and the other one is black

S = the set of all sets of 3 socks

$$n(S) = 10C3$$



$$n(A) = 4C2 * 6C1$$



"and"

$$P(A) = \frac{4C2 * 6C1}{10C3} = \frac{3}{10} = .3$$

$$P = \frac{\binom{r}{x} \binom{N-r}{n-x}}{\binom{N}{n}}$$

Hypergeometric Distribution