$3! = 3 \times 2 \times 1 = 6$

$\binom{5}{2} = {}_5C_2 = \frac{5!}{2!(5-2)!}$

$P(2 \le X < 4)$

$P(X = 2) + P(X = 3)$

Say $n = 100$

$P(X > 2) = 1 - P(X < 3)$

$= 1 - P(X \le 2)$

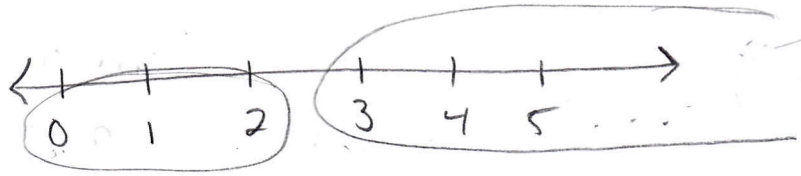
$= 1 - [P(X=0) + P(X=1) + P(X=2)]$

Binomial Distribution

$P(X = k) = \binom{n}{k} p^k (1-p)^{n-k}$

n is number of trials

p is the probability of "success"



OpenIntro p. 156-157

4.22 7% of teens (13-17 yrs) suffer from arachnophobia

10 teens/tent, indep of each other

Interested in event that a teen suffers from arachnophobia

X = # teens suffers from arachnophobia <suffering from acachnophobia is "success">

$P(\text{success}) = p = 0.07$

# of trials $= n = 10$

$P(X = k) = \binom{10}{k} 0.07^k \, 0.93^{10-k}$

a) At least one → $P(X \ge 1) = P(X=1) + P(X=2) + \ldots + P(X=10)$

$= 1 - P(X < 1)$

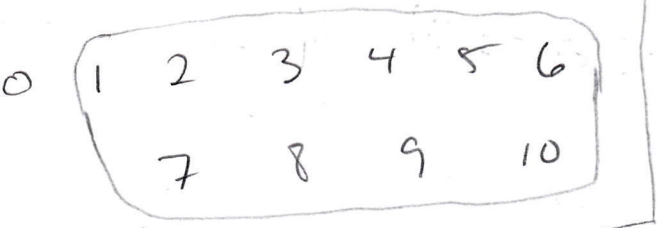
$= 1 - P(X = 0)$

$= 1 - \binom{10}{0} 0.07^0 \, 0.93^{10}$

$= 1 - 0.484$

$= 0.516$

$\binom{10}{1} = \frac{10!}{1!\,9!} = 10$



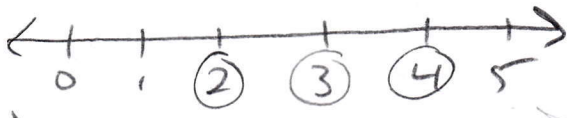
b) $P(X = 2) = \binom{10}{2} 0.07^2 \, 0.93^8$

c) $P(X \le 1) = P(X=0) + P(X=1)$

$= 0.484 + \binom{10}{1} 0.07^1 \, 0.93^9$

$= 0.484 + 10 \times 0.07 \times 0.520 = 0.484 + .364 = 0.848$

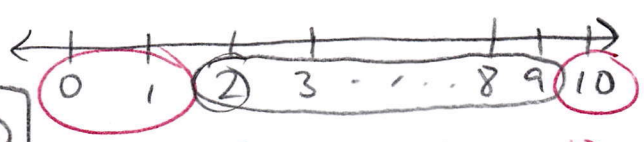
$P(2 \le X \le 4)$



$= P(X=2) + P(X=3) + P(X=4)$

$P(2 \le X < 10)$

$1 - [P(X=0) + P(X=1) + P(X=10)]$



sample space

Complement: 0, 1, 10

4.18 success = adult had chicken pox

X = # of adults who had chicken pox

$p = 0.9$ $\quad n = 100$

$$P(X=k) = \binom{100}{k} 0.9^{k} \, 0.1^{100-k}$$

$P(X > 50) = P(X=51) + \dots + P(X=100)$

$1 - P(X \le 50)$

We want an alternative! $\longrightarrow$ Section 6.5