Tutorial 5

Question 2

- In a sequence of Bernoulli trials with probability p for success, find the

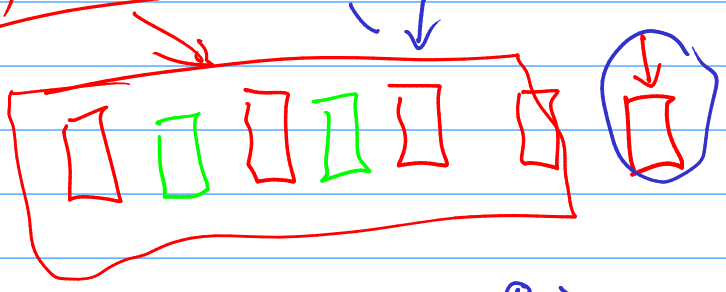
1. probability that x successes will occur before y failures.

2.

Rephrasing: we get at most $y-1$ failures before x successes.

$P(j \text{ failures exactly before } i \text{ successes}) = (p)\ {}^{i+j-1}C_j\ (p)^{i-1}(1-p)^j$

$j, i-1$



Ans =

$j \Rightarrow 0, \ldots y-1$

$x=3$

$y=2$

$$= \sum_{j=0}^{y-1} {}^{x+j-1}C_{x-1}(p)^x(1-p)^j$$

$\sum_{j=0}^{y-1} P(\text{exactly } j \text{ failures bf. } x \text{ successes})$

Question 4

- Colorblindness appears in 1 per cent of the people in a certain population.
- How large must a random sample (with replacements) be if the probability of its containing a colorblind person is to, be 0.95 or more?

x

$P(\text{a person is cb}) = 0.01 \quad ; \quad P(\text{not cb}) = 0.99$

$P(\text{no colorblind person in pop. of size } x) = (0.99)^x$

$P(\text{atleast one cb}) = 1 - P(\text{no} \ldots) = 1 - (0.99)^x \geq 0.95$

$\Rightarrow \quad 1 - (0.99)^x \geq 0.95$

$(0.99)^x \leq 0.05$