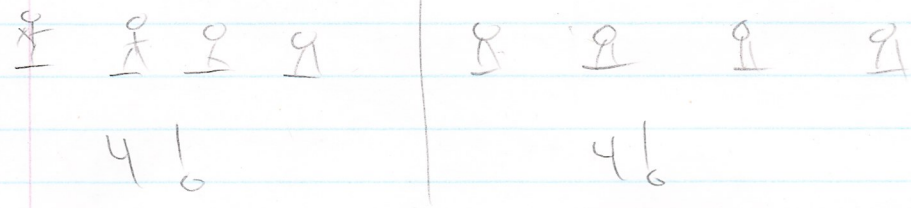
Oct 2014

1) a) $8 \cdot 7 \cdot 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1 = 8!$

b) couple couple couple couple — 4 days to arrange = $4!$ couples

$4! \cdot 2! \cdot 2! \cdot 2! \cdot 2! = 192$

c) 

$4! \times 4!$

2) $P(E) = 0.2$, $P(T|E) = .75$ ← of, if, what, given

$P(T|E') = 0.2$

$$P(E|T) = \frac{P(T|E)P(E)}{P(T|E)P(E) + P(T|E')P(E')} = \frac{(.75)(.2)}{(.75)(.2) + (.8)(.2)} =$$

$= 0.4839$

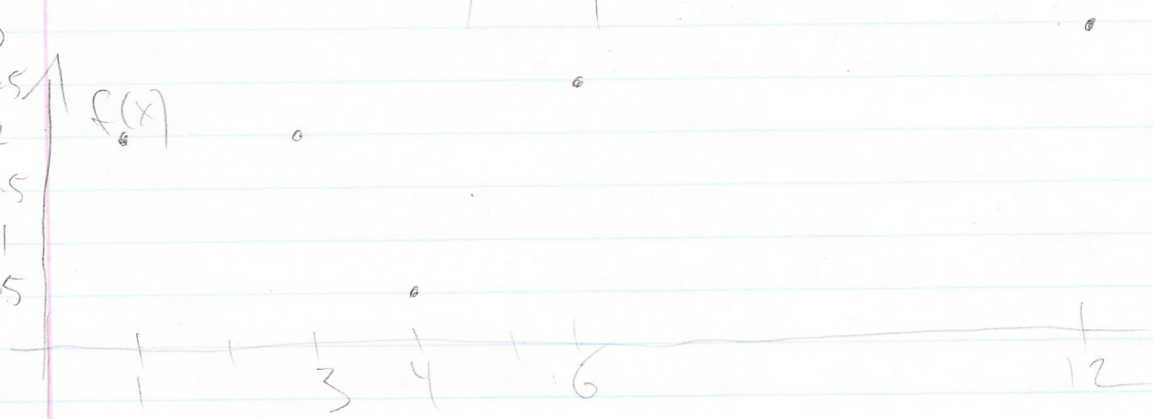
3) F → f

x	1	3	4	6	12
f(x)	.2-0	.4-.2	.45-.4	.7-.45	1-.7

a) What can x be equal to?

x	1	3	4	6	12	
f(x)	.2	.2	.05	.25	.3	must add to 1

b)



Small f dots big F lines

don't connect

.7 − .2 = 0.5

F(6) − F(2)

c) $P(3 \leq x \leq 6)$

d) $E(x) = \sum x f(x)$

$= 1(.2) + 3(.2) + 4(.05) + 6(.25) + 12(.3)$

$= 6.1$

$V(x) = E(x^2) - [E(x)]^2 = 55 - (6.1)^2 = 17.79$

(can't be negative)

e)

$E[Y] = \sum (x+1) f(x) = 2(.2) + 4(.2) + 5(.05) + 7(.25) + 13(.3)$

$= \#$

4) a) Fixed #, Bernoulli → binomial

X = # of success here # of non defectives

$n = 5, \; p = 0.85$

$P(X=5) \Rightarrow \binom{5}{5} (.85)^5 (.15)^0 = 0.4437$

b) expected → mean $\quad \mu = np = 5(.85) = 4.25$

Find on sheet

c) $\sigma^2 = np(1-p) = 5(.85)(.15) = .6375$

$\sigma = \sqrt{\sigma^2} = .7984$

4) - ~~Binomial~~ Binomial again

- X is # of trials (boxes) w/ only nondefectives

$n = 10$, p = part a ≈ 0.4437

$P(X \geq 8) = P(X=8) + P(X=9) + P(X=10)$

e) Until 1st success → Geometric or Neg Binomial

X = # of boxes until 1st success

$r = 1$, $p = .4437$ Since $r=1$ we can call distribution geometric

5) average ⇒ poisson

a) - X: # Something per Something
Bus minute

- $\lambda = \frac{360}{\text{hr}} \frac{1\text{hr}}{60\text{min}} = 5/\text{min}$
- $P(X=0) = \frac{e^{-5}(5)^0}{0!} =$

b) $\lambda = 5/\text{min} = 10/2\text{min}$

c) 5) pois
5) # buses / 2 min
5) $\lambda = 10/2\text{min} \rightarrow P(X=10) = \frac{e^{-10}(10)^{10}}{10!}$