HW 6.3 Part A pages 403-404 prob 69-73, 75-78

(69) B: yes s: germinate f: germinate X: # of seeds that germinate
I: yes, reasonable each seed is ind from each other
N: yes, n=20
S: yes, p=.85 every time ∴ binomial distribution
X is binomial random variable, B(20, .85)

(70) Y= # whose last names have more than 6 letters
B: yes s: Y>6 f: y≤6
I: no, names drawn w/o replacement
∴ not a binomial distribution

(71) V: # of students chosen
B: yes s= left handed person f= right handed person
I: yes selected randomly + students' handedness is independent
N: no, no fixed # of trials since you continue until you find a left-handed student

∴ not a binomial distribution
(V is not a binomial random variable)

(73) W = # who are left handed
B: yes s: left handed f: right handed
I: since students selected randomly, their handedness is independent
N: yes, n= 15
S: yes, p=.10 is constant

∴ binomial distribution B(15,.10)
W is a binomial random variable with B(15, .10)

(73) a) A binomial distribution is not an appropriate model for an NFL field goal kicker, because each field goal may be attempted from different distances, and the prob of success is likely to change for each one (not remain constant)

b) It would be reasonable to use a binomial distribution for free throws made by an NBA player because

B: yes s = make f = miss
I: yes reasonable to assume ind for each shot
N: yes $n = 150$ attempts
S: yes $p = .8$ each time

(75) X = the # who have type O blood $p = .44$ $1-p = .56$
B(7, .44)

$$P(X=4) = \binom{7}{4}(.44)^4(.56)^3 = .23$$

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There is about a 23% chance that exactly 4 of the 7 people chosen have blood type O.

* To receive full credit you must have all the stuff highlighted in green written out *

(76) Y = # of plants that die before producing any rhubarb.

$n = 10 \quad p = .05 \quad 1-p = .95$

$B(10, .05)$

$$P(Y=1) = \underbrace{\binom{10}{1}}_{10}(.05)^1(.95)^9 \approx .315$$

There is about a 32 % chance that exactly 1 of the 10 rhubarb plants will die before producing any rhubarb.

(77) X = the # who have type O blood

$B(7, .44) \quad \underset{S}{p = .44} \quad \underset{F}{1-P} = .56$

$$P(X > 4) = P(X=5) + P(X=6) + P(X=7)$$

$0\ 1\ 2\ 3\ 4\ 5\ 6\ 7$

$$= \underbrace{\binom{7}{5}}_{21}(.44)^5(.56)^2 + \underbrace{\binom{7}{6}}_{7}(.44)^6(.56)^1 + \underbrace{\binom{7}{7}}_{1}(.44)^7$$

$= .1402$

or

1 − binomcdf (7, .44, 4) = .1402

where n = 7, p = .44

X > 4

About 14 % chance that more than 4 people of the 7 chosen will have blood type O.

Y = the number of plants that die before producing any rhubarb

$B(10, .05)$ $\underset{s}{p} = .05$ $\underset{f}{1-p} = .95$

$P(Y \geq 3) = 1 - P(Y \leq 2)$

0 1 2 3 4 5 6 7 8 9 10

$= 1 - \text{binomcdf}(10, .05, 2) = .0115$

where n = 10, p = .05 and x = 2

There is about a 1.15% chance that 3 or more plants will die before producing rhubarb, so this would be surprising if it occurred.