Homework 6

Due March 2, 2017 at 5pm in Snedecor 2404

Please show all work for full credit. Print and staple your assignment together and submit by 5pm of the due date in Snedecor 2404. If you cannot attend class or office hours on the due date, please arrange to submit your homework prior to the due date.

1. [Ch. 5.1, Exercise 1, pg. 243] A discrete random variable X can be described using the probability function, $f(x)$:

x	2.00	3.00	4.00	5.00	6.00
$f(x)$	0.10	0.20	0.30	0.30	0.10

   a) Make a probability histogram for X. Also plot $F(x)$, the cumulative probability function for X.
   b) Find the mean and standard deviation of X.

2. [Ch. 5, Exercise 1, pg. 322] Suppose 90% of all students taking a beginning programming class fail to get their first program to run on first submission. Use a binomial distribution and assign probabilities to the possibilities that among a group of six such students,

   a) all fail on their first submissions
   b) at least four fail on their first submissions
   c) less than four fail on their first submissions

   Continuing to using this binomial model,

   d) what is the mean number who will fail?
   e) what are the variance and standard deviation of the number who will fail?

3. [Ch. 5, Exercise 2, pg. 322] Suppose that for single launches of a space shuttle, there is a constant probability of O-ring failure (say .15), Consider ten future launches, and let X be the number of those involving an O-ring failure. Use an appropriate probability model and evaluate all of the following:

   a) $P[X = 2]$
   b) $P[X \geq 1]$
   c) $\mathrm{E}X$
   d) $\mathrm{Var}X$
   e) the standard deviation of X

4. Sketch probability histograms for the binomial distributions with $n = 5$ and $p = .1, .3, .5, .7,$ and $.9$. On each histogram, mark the location of the mean and indicate the size of the standard deviation.