## **HW 6**

## STAT 544, Fall 2015

Each homework assignment will be worth 20 points, and your best 10 of 12 assignment scores will be averaged to determine the homework contribution to your overall course average.

Note: Five of the of the seven parts below will be graded, with each graded part worth 4 points.

1) Suppose that during the month of April, false alarms at a given location will randomly occur according to a Poisson process with a rate of 1 false alarm every 5 days. What is the probability, rounded to the nearest thousandth, that during the first 10 days of April exactly two false alarms will occur, given that at least one false alarm will occur during this period?

2) Letting X be the number of bridge hands a player will be dealt until he obtains at least 3 aces, give the value of E(X). (Each bridge hand is a random subset of 13 cards from a standard deck of 52 playing cards (and a standard deck of playing cards contains 4 aces).)

3) Consider a random variable X having pdf

$$f_X(x) = \left(\frac{3x^2}{16}\right) I_{(-2,2)}(x)$$

- (a) Give the value of  $P(-1 < X \le 3/2)$ .
- (b) Give the cdf of X.
- (c) Give the pdf of  $Y = X^4$ .
- (d) Considering the random variable Y defined in part (c), give the value of  $E(Y) = E(X^4)$ . (Comment: You can obtain the desired value using either the pdf of X or the pdf of Y. Of course, doing it both ways can provide a check of your work (but if you get two different values, be sure to clearly indicate which one you want me to base your score on).)
- (e) Give the value of the variance of X. (Note that I'm requesting the variance of X for this part; not the variance of  $Y = X^4$ . Also, if you sketch the pdf of X, you should guess that the mean of X is 0. Still, I want you to use calculus to confirm such a guess.)