HW 9

STAT 346, Spring 2010

I'll make each homework assignment worth 10 points, so that when I count your best 10 of 13 assignment scores, your overall homework score will be out of 100 points possible. For this assignment, four of the eight *parts* to be turned in will be selected for grading, each being worth 2.5 points.

1) Consider a random variable X having pdf

$$f_X(x) = \frac{4}{15} x^3 \, I_{(1,\,2)}(x).$$

(a) Give the value of $E(X)$.

(b) Give the value of $E(X^2)$. (*Note*: This is the same density used in Problem 8 of HW 7. In that Problem you were requested to obtain the pdf of $Y = X^2$. You can use that pdf to obtain the value requested here. Alternatively, you can find the desired expectation by just using the pdf of X given here. Of course, doing it both ways provides a partial check of your work.)

2) Consider a random variable X having pdf

$$f_X(x) = \frac{1}{x^2} \, I_{(1,\,\infty)}(x).$$

If U is a uniform $(0,\,1)$ random variable, give a function of U which has the same distribution as X.

2) Consider a random variable X having cdf

$$F_X(x) = \frac{x-3}{x-2} \, I_{[3,\,\infty)}(x).$$

If U is a uniform $(0,\,1)$ random variable, give a function of U which has the same distribution as X.

4) Do Exercise 9 on p. 296 of the text.

5) Do Exercise 15 on p. 296 of the text.

6) Do Problem 3 on p. 325 of the text.

7) Do Problem 5 on p. 325 of the text.

8) Do Exercise 2 on p. 295 of the text, *except* change 50 to 100, and change 45 to 85.

9) Do Exercise 16 on p. 296 of the text, assuming that the bulbs survive or fail independently.

10) Do Exercise 4 on p. 303 of the text.

11) Do Exercise 9 on p. 304 of the text, *except* change 12 to 4. (*Hint*: Although this exercise follows the material on exponential distributions, it pertains to a gamma random variable, and it's actually most easily solved using a Poisson random variable. (Find an event involving a Poisson random variable that's equivalent to the event that the 4th "event" in a Poisson process occurs before 8 hours.) It can also be noted that an exponential distribution seems like a poor choice for the situation described.)

12) Do Problem 11 on p. 325 of the text. (*Note*: The mean of the exponential distribution is $1/\lambda$. It can also be noted that an exponential distribution seems like a poor choice for the situation described.)

Turn in solutions for Problems 1, 2, and 8 through 12, but not 3 through 7.