Statistics 630 - Assignment 7

(due Wednesday, October 29, 2014, 11:59 pm)

Instructions:

- The textbook exercises are in the book by Evans and Rosenthal. This assignment covers material on expectations from Chapters 4 and 5 discussed in Lectures 20–22.
- Whether you write out the solutions by hand or in a text document, be sure that they are *neat, legible and in order* (even if you choose to solve them in a different order).
- **Type** your name, email address, course number, section number and assignment number at the top of the first page (or cover page).
- Either scan or print your solutions to a **PDF** file under 15MB in size. It must be in a *single* file, not separate files for separate pages. Name the file using your name (for example, I could use twehrly630hw01.pdf) to avoid confusion with other students and/or assignments. *Do not* take a photo of each page and then paste them into a document – this will make your file too big and the results will generally not be very readable anyway.
- Login to your WebAssign account to upload your file. You must do this by **11:59 pm U.S. Central time**, *according to the WebAssign server*, on the due date. We highly recommend that you start the upload at least 15 minutes earlier. You can make multiple submissions, but *only the last submission will be graded*.

Answer the following problems from Chapter 4:

4.6.1, 4.6.3 ($C_1 \neq 0, C_3 \neq 0$, solution in text is not correct), 4.6.5, 4.6.6, 4.6.7, 4.6.8

4.6.10, 4.6.12 (The text says "compute the distribution of..." in these problems, but all you need to do is to identify the distribution using the results in Section 4.6.)

Answer the following problems from Chapter 5:

5.1.11 (Use the R function **rnorm** to generate a normal random sample of size 10000 and use this to estimate $P(Y \in (1, 2))$.

5.3.11

5.4.11 Use the R function **rnorm** to generate the normal random sample. The R function **plot.ecdf** can be used to plot the empirical distribution function. It would be instruction to overlay the true cdf on this plot using the R function **pnorm**.

Here is a start to your code:

y=rnorm(1000,mean=3,sd=sqrt(2))

plot.ecdf(y)

x=seq(-2,8,length=1001)

lines(x,pnorm(x,mean=3,sd=sqrt(2)),col=2)

For parts (b) and (c) you should use the R function **dnorm** to compute the true pdf for the overlay. To draw the histogram in part (b), you can use the code:

hist(rnorm(1000,3,sqrt(2)),breaks=seq(-3,9,length=13),freq=FALSE)

5.5.5

5.5.19 You can use the R functions **rchisq** to generate the sample and **boxplot** to form the boxplot.

5.5.20
Note: In part (b), μ and σ are assumed to be unknown (even though you used $\mu = 4$ and $\sigma = 1$ to generate the sample). So you have to estimate them first from the sample data before doing the computation requested in (b).