Math 8 SPSS Project 2
Due April 14, 2010

1. Be sure to open the Shared drive before you start, as in Project 1. When you start SPSS, it usually asks "What would you like to do?" Select "Open another type of file," then More Files, and click OK. Then look in the Greenwell folder in the shared drive, open the SPSS syntax files folder, and select "uniform." (Note: To see this file, make sure that under Type of file, you select Syntax(*.sps) or All files(*.*).) This is a file known as a syntax file. It creates 40 columns, known as x1 through x40, of 300 integers randomly generated between 0 and 9. It then takes the mean for each row of variables x1 through x10 and puts the mean for each row in the variable avg10. It next takes the mean for each row of variables x1 through x40 and puts the mean for each row in the variable avg40. Before continuing, under Transform, select "Random Number Generators." Under Active Generator Initialization-Set Starting Point, make sure Random is checked and then click OK. (This causes the randomly selected to be unique to you.) Then return to the syntax editor, and under the Run menu, select All to make all of this actually happen.

2. Select Analyze-Descriptive Statistics-Descriptives. Move the x1, avg10, and avg40 under Variables and click OK. Notice that avg 10 and avg40 are at the end of the list of variables.

3. Under Graph-Chart Builder, select Histogram, and do three histograms, one at a time: one for each of the variables x1, avg10, and avg40. (Recall from Project 1 how to create histograms.)

4. Now repeat what you did in step 1, but this time using numbers randomly generated according to the Poisson distribution. (Don't worry about what this means, but if you are curious, see Sec. 5-5 in the text.) We will specify that this distribution has a mean of 1.5. Just change "uniform(9)" in the syntax file to "rv.poisson(1.5)". (Don't forget the period at the end.) Then select Run-All.

5. Repeat steps 2 and 3 with the Poisson data.

6. Print the output of what you have done. Be sure, when the Print box comes up, to select "All visible output" under Print Range.

7. Select Exit, and don't save anything.

8. Hand in:
a) the computer output;
b) your answers to the questions on the next page.

Questions to answer, based on the SPSS output.

1. How does the shape of the distribution of the mean of 300 integers between 0 and 9 change as you go from $n = 1$ (x1) to $n = 10$ (avg10) to $n = 40$ (avg40)?

2. Answer question 1 for the Poisson data.

3. Using the method of Sec. 5-2, find the mean of a distribution with values 0, 1, ..., 9, each with probability 1/10. Compare how close the means generated by SPSS for $n = 1$ (x1), $n = 10$ (avg10), and $n = 40$ (avg40) are to this theoretical mean.

4. The mean for the Poisson data was set at 1.5. Compare how close the means generated by SPSS for $n = 1$ (x1), $n = 10$ (avg10), and $n = 40$ (avg40) are to this theoretical mean.

5. Using the method of Sec. 5-2, calculate the standard deviation for a distribution with values 0, 1, ..., 9, each with probability 1/10. Then, using the Central Limit Theorem, calculate the standard deviation of the sample means for samples of size 10 and 40. Compare your results with the standard deviations generated by SPSS for x1, avg10, and avg40.

6. The standard deviation for the Poisson distribution with mean 1.5 turns out to be the square root of 1.5. (You can just take my word for this.) Using the Central Limit Theorem, calculate the standard deviation of the sample means for samples of size 10 and 40. Compare these three numbers with the standard deviations generated by SPSS for x1, avg10, and avg40.