Statistics 302 Spring 2014 Larget Assignment #3 posted February 6, 2014

Due Friday, February 14

Textbook Exercises

3.20, 3.24, 3.25, 3.28, 3.36, 3.38, 3.54, 3.60, 3.61, 3.62, 3.76, 3.79, 3.80

Computer Exercises

R problem 1 Load the data set **USStates** from the textbook into R.

1. Use the `ggplot2` library to draw a suitable graph of the *Smokers* variable, the percentage of residents who smoke. Describe the shape and center of this distribution.
2. What is the mean proportion of smokers, averaged evenly across the 50 states?
3. Write a function in R that will take 10,000 random samples of 5 states and return the mean proportion of smokers for each sample. This is a simulation of the sampling distribution of the sample mean proportion of smokers. Calculate the mean and standard deviation of this sampling distribution and use `ggplot2` to display the distribution with a density plot. Describe the center and shape of the distribution in this plot.
4. What is the standard deviation from the previous part called?
5. One sample of five states is Arkansas, Florida, Pennsylvania, California, and Vermont. Find the mean proportion of smokers across these five states and use information from earlier parts to construct a 95% confidence interval for the mean proportion of smokers. Does this confidence interval contain the true mean?
6. What proportion of the 10,000 randomly sampled means are actually within the margin of error of a 95% confidence interval? How close is the actual number to what the expected proportion is?

R problem 2 Load the data set **CommuteAtlanta** into R.

1. How many cases are there? What variables are included? Find the mean and standard deviation of each quantitative variable.
2. Use R to apply the bootstrap: take 1000 bootstrap samples. Compute the standard deviation of the 1000 sample means distances. Construct a 95% confidence interval for the mean commute distance in Atlanta.
3. Interpret this confidence interval. What important assumptions are you making for this interpretation to be correct?