Homework #4

1. (5 points) Confidence intervals. A student is suspicious of the formula of confidence intervals her sloppy professor wrote down on a napkin over lunch. She decided to conduct an experiment to check on the correctness of the formula. She generated random samples from computer and used the professor's formula to calculate a 95% confidence interval from each sample. Then she checks for each sample if the true parameter falls within the confidence interval. After checking 98 samples, the confidence interval contains the true parameter 93 times. "Ha," she said, "now the confidence interval has to contain the true parameters in all next two times to be correct." When it turns out that in the next two samples, none of the confidence intervals contain the true parameter, she gleefully told her classmates that the professor made another mistake. Do you agree with her? Why and why not? What is the probability that a 95% confidence interval contains the true parameter in exactly 95 out of 100 random samples?

2. (5 points each) Exercises 10.8.4, 10.8.5,

3. (10 points) Exercises 10.8.11,
4. (10 points) Exercises 10.8.15,
5. (10 points) Exercises 10.8.17 (by R. Notice that the first column "trtment" is NOT used in this question. You read the whole data set into R when input the "*bayley*" data set, but only use other relevant variables here. These 10.8.17 questions are one-sample questions. The "trtment" variable is only used in questions in chapter 11.)

6. (15 points) Exercise 11.5.13.
7. (10 points) Exercise 11.5.16

Following is the demo mentioned in the class, which you can run to have a better understanding of the meaning of confidence intervals. (This example is not related to this homework).
library(TeachingDemos)
ci.examp(mean.sim =60, sd = 5, n = 15, reps = 100, method = "z", lower.conf=0.025, upper.conf=0.975)