Homework 1

Due: Tuesday, Sep. 19th, by 11:00 am

You are expected to solve all the five problems by yourselves. Discussions within your group are encouraged but you must write out your own answers in your own words. Duplicate homework will not receive credit. Make sure you show all of your work and attach your R-script for full credit. The datasets for the problems can be downloaded from Canvas. ***Please turn in your homework report right before the lecture time.***

1. Sec. 2.8, Problem 1 (a), (b), (c) in textbook
2. Sec. 2.8, Problem 3 in textbook
3. Sec. 2.8, Problem 4(a) in textbook
4. Sec. 2.8, Problem 7 in textbook
5. (**Grade point average**) The director of admissions of a small college selected 120 students at random from the new freshman class in a study to determine whether a student's grade point average (GPA) at the end of the freshman year (Y) can be predicted from the ACT test score (X). The data are saved in the file *"Grade_Point_Average.txt"*. Suppose a simple linear model (that is, $Y = \beta_0 + \beta_1 X + \epsilon$) is applied to the data.

   a. Get the scatterplot of GPA vs. ACT test score.
   b. Set up the ANOVA table.
   c. Conduct an F test of whether or not $\beta_1 = 0$. Given a significance level $\alpha = 0.01$, write down the null and alternative hypothesis, specify the decision rule and state your conclusion **with context.**

   d. Obtain the correlation coefficient r from the ANOVA table.

Remark: *If the significance level is not specified, just set $\alpha = 0.05$.*