V506 Homework Exercise 3

**Part I - Bivariate Regression Analysis Without R (28 points)**

**Pg. 278**

**9.3 (8 points)**

**Pg. 285 – if true, briefly explain why**

**9.58 (8 points)**

**9.61 (6 points)**

**9.59 (6 points)**

**Part II: Bivariate Regression with R (72 points)**

Use R to do the following problem. You must submit the relevant pages of your output when you turn in the exercise. Remember to thoroughly interpret your results. The computer makes it simple to do the calculations, it’s your job to show you know what the results mean.

1. One of the challenges that university administrators must deal with is deciding which students to admit to their institution, and which to deny. To help make these decisions, admissions officers often rely on quantitative data about student performance, such as scores on standardized tests like SAT exam (14 points).

1. Estimate a model where College GPA (colgpa) is the dependent variable, and scores on the SAT test (sat) is the independent variable. At the 0.01 level, can we conclude that students who score better on the SAT generally perform better in college?

2. Use the Real Estate dataset (22 points).

1. Let selling price be the dependent variable and size of the home the independent variable. Determine the regression equation. Estimate the selling price for a home with an area of 2,200 square feet.
2. Let selling price be the dependent variable and distance from the center of the city the independent variable. Determine the regression equation. Estimate the selling price of a home 20 miles from the center of the city.

3. Use the 2009 Baseball Data Set (36 pts).

1. Let attendance be the dependent variable and total team salary be the independent variable (note, both variables are measured in millions). Construct a scatterplot of the two variables. From the diagram, does there seem to be a direct relationship between the two variables?
2. Estimate a linear regression model for these variables, and interpret all of your results.
3. What is the expected attendance for a team with a salary of $80 million?
4. If the owners pay an additional $30 million, how many more people could they expect to attend?