**Dr. Zhankun Sun, Kevin**

**MS 5318 – Homework # 3**

**Use R to answer the questions for this assignment. Include the R codes in your submission.**

In order to help clients determine the price at which their house is likely to sell, a realtor gathered a sample of 150 purchase transactions during a recent three-month period. For the response in the model, use the price of the home (in thousands of dollars). There are four candidate explanatory variables:

* number of square feet (in thousands),
* number of bathrooms,
* lot size,
* median household income (in thousands) of the area where the home is located.

(1) What are the mean and median home price in the data set?

(2) Make a histogram of the response variable *Price*. When you use the R function hist(), include the following arguments: breaks=15, xlab="Home Price", ylab="Counts", col="grey". Use comma to separate different arguments in the R function. Try to understand the meanings of those arguments.

(3) Examine the scatterplots of the pairs of variables in the data set. Attach the scatterplots to this assignment.

(4) Fit a multiple regression model, using all four explanatory variables. Include the model summary in your submission (e.g. estimated coefficients, p-value, F-test results, etc.).

(5) Does the estimated model appear to meet the conditions of multiple regression model? (Check model conditions: residual plots, normal quantile plot.)

(6) Does this model explain statistically significant variation in the prices of homes? Give your reasons.

(7) Interpret the estimated coefficient for *Sq.Feet*. What does this coefficient mean? What does its p-value mean?

(8) Compare the marginal coefficient for the number of bathrooms to the partial coefficient. Explain why these are so different.

(9) A homeowner wants to sell her home with: Sq.Feet = 3, Bathrooms=3, Lot.Size=9, Median.Income= 10. Give a 95% prediction interval for the price of her home.

(10) A homeowner asked the realtor if she should spend $40,000 to convert a walk-in closet into a small bathroom in order to increase the sale price of her home. What does your analysis indicate?