CHE384 Data to Decisions
Chris Mack, Fall 2018

Exam 1 – Take home portion (75%)

Notes:

- Bring your printed exam (with answers to the following questions, including graphs, etc.) to class, to be turned in at the end of class Thursday. Try to make this document stand-alone, so that it makes sense without the supporting spreadsheet or R code/results (e.g., insert graphs as appropriate, provide values for statistics and results, explain what you did to get your results, etc.).
- Please name the file with supporting calculations using this format: Exam1_yourname.xlsx or Exam1_yourname.R, and email the supporting documents by the start of class on Thursday to: chris@lithoguru.com.

In Data_Sets_2.xlsx, the "Water BP" tab contains measurements of the boiling point of water (T) versus barometric pressure (P). For an ideal gas, these are related by the Clausius-Clapeyron equation:

$$\ln P = -\frac{L}{R}\left(\frac{1}{T}\right) + c$$

where L = specific latent heat of vaporization, and R = universal gas constant.

1. (30 pts) Using OLS, create a model to predict the boiling point of water given the barometric pressure. Report the best fit model coefficients and their confidence intervals. Provide an explanation for what this model means in the context of this problem (i.e., what does the slope tell you? what does R^2 tell you?)

2. (35 pts) Test the assumptions of OLS for this model. Provide the results of these tests and your conclusions.

3. (5 pts) Perform an Overall F-test on the model. What do you conclude?

4. (5 pts) There are other options for regression besides OLS. Based on the regression approaches we have discussed in class so far, describe which one(s) might be a candidate approach for this data set and why. (You do not actually need to perform the regression!)