I. **Sections to Read** (All content from DeGroot and Schervish's *Probability and Statistics* unless otherwise noted) A digital copy of the textbook is available for on our class PWeb site, under the Day One Access tab.

    (a) Section 11.2

II. **Objectives** (By the end of the day's class, students should be able to do the following:)

- State the necessary conditions for simple linear regression and prove that the least squares regression equation gives the MLE estimates for linear coefficients under these assumptions.
- Describe the joint sampling distribution for the linear coefficients in the simple linear regression model.
- Compute the mean squared error for a prediction made from a simple linear regression model.

III. **Reflection Questions** (Submit answers on Gradescope `https://www.gradescope.com`)

    1) True or False? The least squares line can be found for any data set $\{(x_1, y_1), \ldots, (x_n, y_n)\}$, regardless of whether the data was generated by a process that satisfies assumptions 11.2.1 - 11.2.5.

    2) Suppose we have data for which the conditions 11.2.1 - 11.2.5 hold. Use a theorem in this section to show that the estimators $\hat{\beta}_0$ and $\hat{\beta}_1$ are **independent** when $\bar{x} = 0$. (Hint: you will need to know both the correlation of these variables, along with their distribution)

IV. **Additional Feedback** Are there any topics you would like further clarification about? Do you have any additional questions based on the readings / videos? *If not, you may leave this section blank.*