

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 11.1

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

- State the definition of the least-squares lines in terms of vertical deviations
- Derive the formula for the coefficients of the least-squares line
- Find the least-squares line for polynomials, as well as for multilinear functions

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

- 1) Suppose we collect measurements on height X and weight Y for 20 infants who are between the ages of 0 and 5 weeks. What is at least one reason why we might be interested in finding the formula for the least squares line for the data $(x_1, y_1), \dots, (x_{20}, y_{20})$? (That is, what is one *use* for the least squares line?)
- 2) Consider the points $(0, 0), (0, -1), (0, 2), (0, 5)$. Explain why there is **not** a unique line that minimizes the squared sum of vertical deviations through these points. *Hint: Plot the points and think about the y -intercept for a line that achieves the minimal squared deviations. How many lines have this intercept?*

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.*