Learning Objectives:

**Correlation, Scatterplots, Introduction to Regression:**
1. Given a study, distinguish between explanatory and response variables.
2. Given a set of raw data, make a scatterplot by hand or using software.
3. Given a scatterplot, identify patterns such as positive and negative associations, non-linear patterns and outliers.
4. Given a correlation coefficient, determine if it is legitimate. That is, determine if its value is between -1 and 1.
5. Given two variables and their correlation coefficient, describe how the correlation changes if the units of either variable are changed.
6. Given two variables (x and y), describe the correlation you would expect to find between x and y.
7. Match given scatterplots with possible values of the correlation coefficient.
8. Explain the relationship between the slope of the regression line and the correlation coefficient.
9. Given the least squares line and a value of x, calculate the predicted value of y.
10. Identify situations in which it is not appropriate to summarize the relationship between variables using a least squares line.
11. Given standard regression output, interpret the estimated regression coefficients and the $r^2$ value.
12. Given a study, explain in context that the regression method is used to estimate the average value of y when you know x and that individual values will vary around the predicted value.
13. Given a study, interpret the value of the square of the correlation coefficient. That is, explain that it measures the proportion of the variance of one variable that can be explained by straight-line dependence on the other variable.
14. Given a least squares line and an observation (x,y), calculate the residual for that observation.

**Relevant Reading:**
- Chapter 2 pg 18
- Chapter 4 pgs 119-123
- Chapter 5 pgs 151-171, 178-180

**Suggested practice problems:**

2.15, 4.4, 5.1, 5.2, 5.3, 5.7, 5.9, 5.11, 5.14, 5.22, 5.23, 5.26, 5.29, 5.31, 5.68