Topic 2.2: Hypothesis Testing in Simple Linear Regression (SLR)

Read Section 2.3 of your textbook. As you read, take notes on the following.

1. In a hypothesis test for the slope, when do we use a *t* statistic instead of a *z* statistic? Which statistic, *t* or *z*, is more commonly used in a real-world setting? Briefly explain.
2. Write down the formula for the standard error of the slope, $se(\hat{\beta}_1)$.
3. Explain why the standard error of the slope decreases as the fit of the model improves.
4. Consider a situation in which we want to test to assess whether or not there is a linear relationship between the predictor and response variable.
   - How do we write the null and alternative hypotheses? Express the hypotheses using statistical notation and describe what these expressions mean in words.
   - What is the formula for the *t* statistic?
   - Do you think a larger or smaller *t* statistic, in magnitude, leads to more evidence against the null hypothesis?
   - What distribution do we compare the *t* statistic to?
5. Explain why the *t*-test for the slope gives the same result as the ANOVA *F* test in an SLR setting.