Topic 9.1

Introducing Statistics: Do Those Points Align?

Do Those Points Align?

Unit 9 builds on concepts about the least-square regression learned in Unit 2. Just like for other population parameters, the slope (or *y*-intercept) of the sample regression model can be used to estimate the slope (or *y*-intercept) of the population regression model. This unit expands the processes and methods presented in Units 6 and 7 to make inferences about the slope (or *y*-intercept) of the population regression model.

In this unit, we will learn how to construct a confidence interval (CI) for the slope (or *y*-intercept) of a regression model and how to justify a claim based on the constructed interval. We will also learn how to conduct a hypothesis test for the slope (or *y*-intercept) of a regression model, how to interpret the results of the test based on its *p*-value and a significance level of interest, and how to justify a claim about the slope (or *y*-intercept) of a regression model.

To prepare for the AP exam, we suggest focusing on developing the following skills:

- For estimating a slope (or *y*-intercept) of a population regression model, be able to:
  - Identify an appropriate CI procedure.
  - Verify whether the conditions for constructing the CI are met.
  - Calculate the standard error and margin of error for a CI.
  - Calculate an appropriate CI.
  - Interpret a CI in context and justify a claim based on the constructed interval.
  - Identify the relationships between sample size, width of a CI, confidence level, and margin of error for the CI.
- For testing a slope (or *y*-intercept) of a population regression model, be able to:
  - Identify the appropriate null and alternative hypotheses and testing procedure.
  - Verify the conditions for a test and calculate the appropriate test statistic and *p*-value.
  - Interpret the *p*-value for a test and justify a claim (compare the *p*-value to a significance level) about the parameters in context.

Note: It is not required to memorize the formulas for the CI and test statistics. The AP exam provides these formulas. However, specific conditions for these inferential procedures must be memorized.