L16: Line of Best Fit Lab

Complete the following exercises with your small group. The goal of this lab is to practice interpreting a line of best fit and using it to make predictions.

1. **Understanding the Variables** You are interested in determining whether a student's high school GPA, `hs_gpa`, is a good indicator of what their freshman year college GPA, `fy_gpa`, will be. Both GPAs must be between 0 and 4.

   (a) What is the independent variable?

   (b) What is the dependent variable?

   (c) Why does it make sense to use high school GPA to predict freshman year GPA instead of the other way around?

2. **Writing the Line of Best Fit** Suppose R gives the following linear model output:

```
Call:
lm(formula = sat$fy_gpa ~ sat$hs_gpa)

Coefficients:
(Intercept)   sat$hs_gpa
0.06067      0.75345
```

   Write the equation of the line of best fit.

3. **Interpreting the Slope and Intercept** Use the model output above to answer the following questions.

   (a) How can we interpret the slope of 0.75345 in context?

   (b) How can we interpret the intercept of 0.06067 in context?

   (c) Does the intercept have a meaningful real-world interpretation here? Why or why not?

4. **Making a Prediction** Use the line of best fit to predict a student's freshman year GPA if their high school GPA was 3.0.

5. **Thinking About the Model** Answer the following questions in complete sentences.

   (a) Would it be reasonable to use this model to predict the freshman year GPA of a student with a high school GPA of 4.8? Explain.

   (b) What is one reason this model might not perfectly predict a student's freshman year GPA?