Comparing Slopes Case Overview

Background on the Classroom Lesson

This video comes from a first-year algebra class in a unit on rates of change. Students have discussed slope both symbolically, in terms of the formula, and conceptually, considering rate of change of the independent variable in terms of the dependent variable and rise over run.

Student Activity

The activity is adapted from Marcy, S., & Marcy, J. (1989). Why did Gyro go into a bakery? *Algebra with Pizzazz!: Practice Exercises for First Year Algebra* (p. 159). Creative Publications.

Which of the following linear equations has a slope of 0 and contains the point $(-5, \frac{3}{4})$:

$$y = \frac{3}{4}$$
$$y = -5x$$

Here is what was pictured on the overhead:



Sherin, M. G., Russ, R. R., Walkoe, J., & Dyer, E. (2023). Algebra classroom video cases. Freezing Time Research Group. <u>https://www.freezingtime.sesp.northwestern.edu/videocases</u>. © 2023. Licensed under Creative Commons AttributionNonCommercialShareAlike 4.0 International.

Overview of the Video

In the lesson, the class is discussing a worksheet in which students select the correct equation for a given point and slope. In the video, the class explores one of the last problems on the worksheet in which the given slope is zero, and students talk about the slopes of horizontal and vertical lines. When watching (or re-watching), focus on what each of the student's comments tells us about their understanding of slope. Consider the reasons students provide for describing the slopes of horizontal and vertical lines in particular ways.

Questions to Consider about Student Thinking

We think some of the richest student thinking in this video occurs around the ideas of horizontal and vertical lines. In what follows, we provide sets of questions about each graph to scaffold analysis of students' ideas.

- 1. Thinking about the Slope of a Horizontal Line:
 - a. How does Veronica talk about a line with a slope of zero?
 - b. Patrick offers two ideas about a line with a slope of zero. What are the two ideas? How are Patrick's ideas related?
 - c. What representations do students use to talk about a line with slope zero? How does each representation help them to make sense of the meaning of a slope of zero?
- 2. Thinking about the Slope of a Vertical Line:
 - a. How does Arnas talk about the slope of a vertical line?
 - b. How does Patrick talk about the slope of a vertical line?
 - c. How does Alfredo talk about the slope of a vertical line?