Slope of the Sine Function

In this activity, you will explore what it means to find the slope of the sine function.

EXPLORE

1. Graph the function function $f(x) = \sin(x)$.

2. Construct a secant line to the graph, with its two points fairly close to each other.

3. Drag the secant line back and forth along the graph. What do you notice about the line as you drag it?

4. How does the behavior change if you start dragging with the two points far apart? What if you start with them really close together?

5. Measure the slope of the secant line, and drag it again. Use the slope measurement to be more specific about what you notice and wonder.

6. To record the slope's behavior, measure the abscissa of one of the two points, x_A, and plot the point $(x_A, slope)$. After plotting the point, do *not* drag the line yet!

7. Befor dragging the secant line, predict what shape the new plotted point will make when you drag the secant. Draw a picture of your prediction.

8. Turn on tracing for the plotted point, and drag the secant line again. Do you notice, or wonder, anything new?

9. Create a button to animate the two points that determine the secant line. What do you notice now as the line goes back and forth?