**Slopes Functions on GSP Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

Go to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and open the **Slopes Lab** for your assigned function.

The slope of the tangent to your curve and the *x* value at that point are given in the upper left hand corner. Click on the “*x = c* ” measurement and the slope measurement in that order. Now click on **Graph** in the top menu and choose **Plot (x,y)**. The orange point now displayed on your graph is **(*c*, *slope at c*)**.

Move the green controller on the x axis. As the tangent moves along the curve, the orange point traces out a new function, “the slope of your curve” function. What familiar type of function does this new slope function seem to behave like?

Once again, click on the “*x = c* ” measurement and then the slope measurement in that order. Click on **Number** in the top menu and choose **Tabulate**. Right click on the table that appears, and choose **Add Table Data…** Check “Add 10 entries as values change, adding 1 every 1.0 seconds.” Move the green controller slowly from left to right. Now take a look at your table. Does the numerical behavior support your previous guess?

Let’s plot your points. Highlight your table. Click on **Graph** on the top menu. This time choose **Plot Table Data…** Use the discrete points to guess an equation for your slope function.

We need to refine this a bit more. Let’s trace the movement of your slope function. Click on the white space to make sure nothing is activated. Highlight the point that moves along your slope function and ***only*** that point. Go to **Display** and the top menu and choose **Trace Plotted Point**… Click and the white space again and highlight the green controller on the x-axis. Click **Edit** on the top menu, choose **Action Buttons** and then **Animation** from the drop down menus. Click the action button. Watch the tangent line as it moves along the given function. Any observations? Click the button again to stop. Do you want to refine your guess for your equation?

Let’s check your guess. Go to custom tools. Is there a regression tool available that would fit your slope function? If so, choose it and click on the appropriate number of points on your slope function. Does it match your guess for the equation? Does it match your trace?

Finally, go to **Graph** and choose **Plot New Function** from the drop down menu. Enter the guess you made for the equation of the slope function. How well does it match?

Go to the bottom of your sketch and choose the tab for page 2.

What’s different about this function? What’s the same?

Create an action button and trace. What is the equation for your new slope function?

Using the slider under the given equation, **drag** to a different integer value for ***a***. Record the value. What is the equation of this slope function?

Try another.

What is the equation for the slope function given *a\*f(x)* for any integer *x* and any real constant *a* ?

Now, go to **Display** on each page and click **Erase Traces.** On page 1, delete the table, plotted points, and the equation you entered as a guess. Your lab is now ready to share with the rest of the class. If you have time, open another function & see if you can find *its* “slope of the tangent function.”