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Chapter 3 AP Calculus Derivatives FUN Exploration!

Getting the Graph of a Derivative from a Function

Note: Do this Exploration entirely on this word doc, on your computer. ☺ (DON'T print this out and then scan after. Rather, type your answers directly in the space here and paste your screenshots, as directed.)

2nd Note: In this activity, you will do a total of 4 screenshots, and answer 3 questions at the end.

INSTRUCTIONS (follow each line carefully!):

ACTIVITY PART I:

1. Go to the site: https://www.geogebra.org/m/rjxtrtwd (it may take a few moments to load, so please be patient)
2. Click on the "Show Tan Segments" checkbox.
3. Click on "New Function" until you find one you like.
4. Move the purple sliders up and down until the tangent line matches the slope of the black function. (i.e. you have selected the correct value of the derivative (slope) there)
5. Once the "accuracy" (shown on the right) is at least 95%, you will be able to click on "Show Derivative". Do that: CLICK on "Show Derivative".
6. Take a screenshot of the entire graph and stuff on the right, and paste below right here. (If you don't know how to take a screenshot on your computer, do a quick search online on how to do that! Or visit here: http://www.take-a-screenshot.org)

   → INSERT SCREENSHOT of DERIVATIVE GRAPH #1 directly below:

7. Click on "New Function" until you find another one you like, and repeat Steps 1-5.

   → INSERT SCREENSHOT of DERIVATIVE GRAPH #2 directly below:

ACTIVITY PART II:

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8. Now go to a ***different*** site: https://www.geogebra.org/m/p6fwvdpd (it may take a few moments to load, so please be patient)
9. Again, repeat Steps 2-6. However, you will not be able to do Step 1, show "tan segments". You will have to use only the shape of the curve to get the accuracy **above 90%**, so that you can CLICK on "Show Derivative" and take your screen shot with that. --If you have difficulty doing this, go back to steps 1-5 again and repeat until you can see the connection between the graph and its derivative! ☺ But try to have fun!!

   → INSERT SCREENSHOT of DERIVATIVE GRAPH #3 directly below:

ACTIVITY PART III:

10. Now go to an **even *DIFFERENT*** site: https://www.geogebra.org/m/zdhfxmyu (it may take a few moments to load, so please be patient)
11. This time repeat Steps 2-6. However, you will not be able to do show "tan segments" NOR have the accuracy shown! You will have to use only the shape of the curve to get the accuracy **above 65%**. Once you do, CLICK on "Show Derivative" and take a screenshot.

    → INSERT SCREENSHOT of DERIVATIVE GRAPH #4 directly below:

ACTIVITY PART IV:

12. Answer the following 3 questions:
    a. In a sentence, explain what the *y-value* of each purple dot represents at a particular value of x.

    b. In one or two sentences, explain how you can tell, just by looking at the original function (in black), if the purple dots will be *above* or *below* the x-axis.

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c. <u>In one or two sentences</u>, explain how you can tell, just by looking at the original function (in black), if the purple dots will be *directly on* the x-axis (have a y-value of zero).