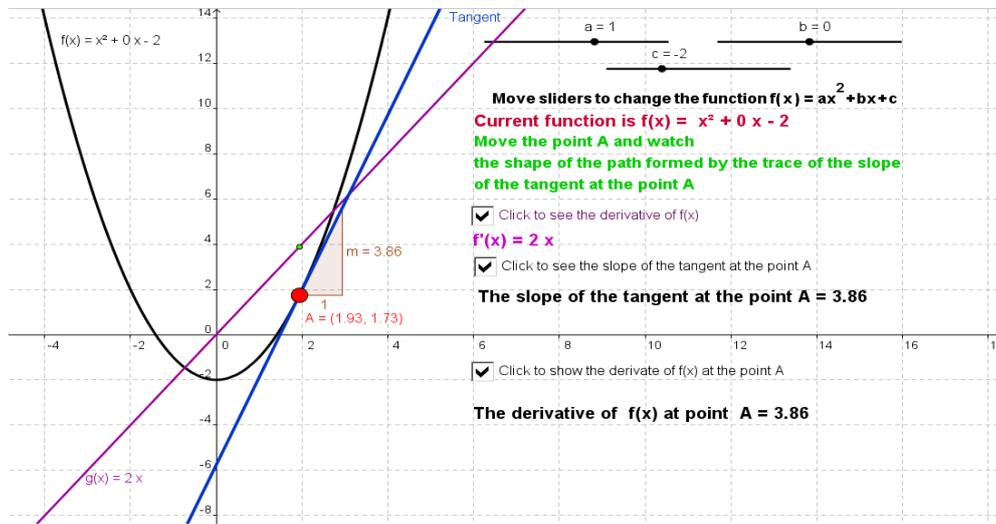


Student Activity: To investigate the Derivative of a Quadratic Function

Use in connection with the interactive file, 'Derivative of a Quadratic Function', on the Student's CD.



Note: Each time the sliders are changed when using this interactive file, one needs to click the reset button  at the top right hand side of the screen.

1. In the interactive file, describe shape of the path followed by the point A?

2. As the point A moves, what happens to the slope of the tangent to the curve at the point A?

3. In the interactive file, as the point A moves, describe the path followed by the trace of the slope of tangent to the curve at the point A

4. Click the  button and set the sliders to the following values: $a = 1$, $b = 4$ and $c = 1$. Describe the graph of the resulting function.

5. With the sliders at the above values, move the point A and note the shape of the path formed by the trace of the slope of the tangent to the curve at the point A.

6. Click the check box on the interactive file and note the equation of the derivative of the function.

7. Click the checkboxes to show the slope of the tangent to the curve at the point A and the value of the derivative of the function at the point A. As A moves around the curve, what do you notice about these?

8. What do you notice the path followed by the trace of the slope of the tangent to the curve at the point A and the graph of the derivative of the function?

9. Change some or all of the sliders a, b, and c. and move the point A as before. Is the relationship between the path followed by the trace of the slope and the graph of the derivative of the function the same as in Q8 above?

Repeat this process at least five times and check if the relationship exists in all these cases.

10. Given a quadratic function, what type of function do you expect the derivative to be?

11. Given the slope of the tangent at a point, what can you conclude about the derivative of the function at that point?

12. By moving the sliders in the interactive file, determine what is the derivative of :
- a. x^2
 - b. $2x^2$
 - c. $3x^2$
 - d. $4x^2$

13. Given $f(x) = ax^2$, can you suggest a rule to find the derivative of this function. Verify your answer using the Tables and Formula booklet.
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14. By moving the sliders in the interactive file, what can you conclude about the derivative of $f(x) = 3x^2 - 4x$?
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15. Find the derivatives of the following functions. (Check your answers using the interactive file.)

a. $f(x) = 2x^2 + 4x + 3$

b. $f(x) = 2x^2 + 4x + 9$

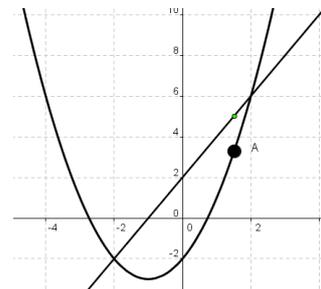
c. $f(x) = 2x^2 + 4x - 9$

d. $f(x) = 2x^2 + 4x - 94$

e. $f(x) = x^2$

16. The diagram shows the graph of the function

$f(x) = x^2 + 2x - 2$ and its derivative. What is the equation of the line?



17. What is the derivative of $f(x) = ax^2 + bx + c$?
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