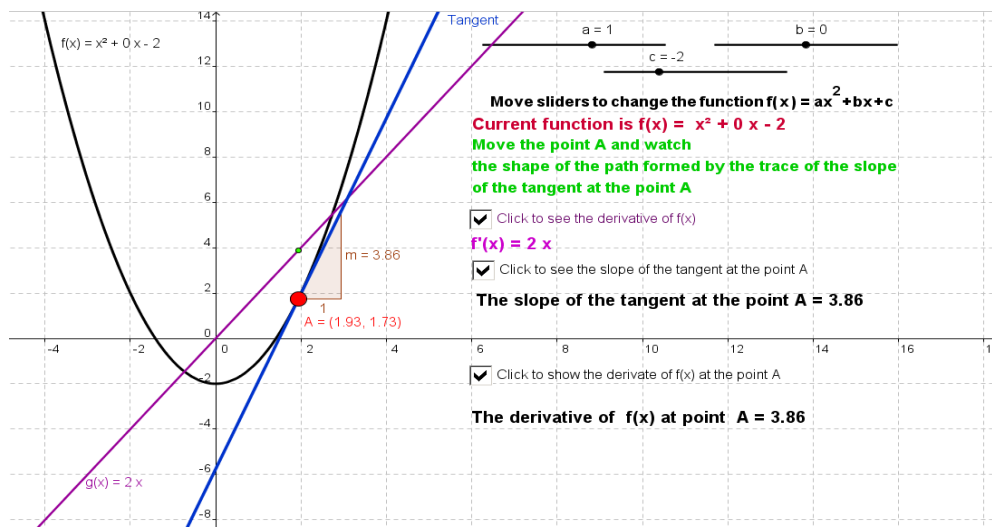




## Student Activity: To investigate the Derivative of a Quadratic Function

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.**

- In the interactive file, describe shape of the path followed by the point A?  
\_\_\_\_\_
- As the point A moves, what happens to the slope of the tangent to the curve at the point A?  
\_\_\_\_\_
- 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  
\_\_\_\_\_
- 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.  
\_\_\_\_\_
- 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.  
\_\_\_\_\_
- 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.
- 

14. By moving the sliders in the interactive file, what can you conclude about the derivative of  $f(x) = 3x^2 - 4x$ ?
- 

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

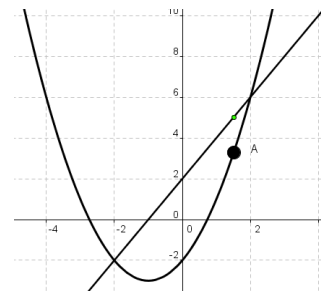
---

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  $f(x) = ax^2 + bx + c$ ?
-