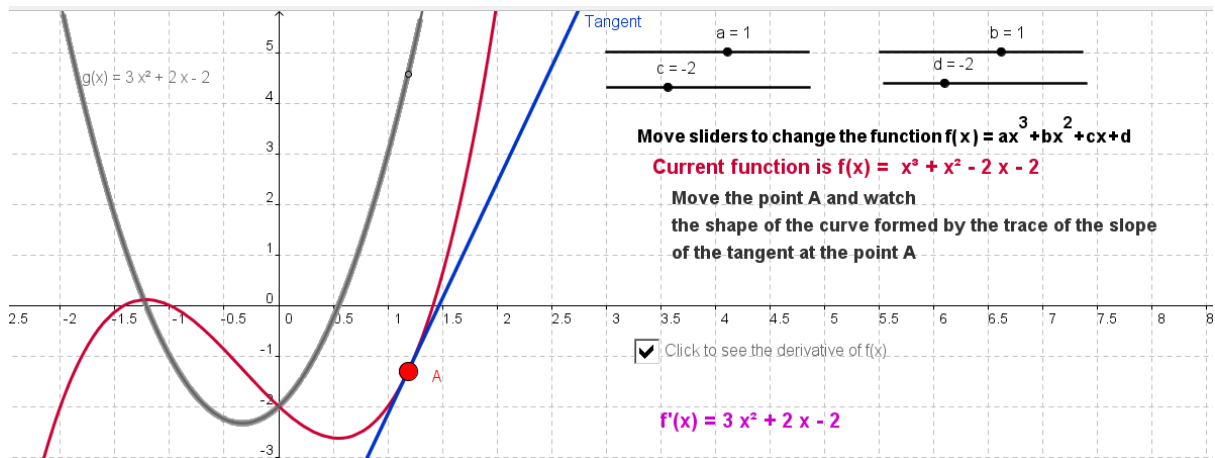



Student Activity: To investigate derivative of a cubic function

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



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

- In the interactive file, what path does the point A follow and what shape is this curve?

- What line moves as the point A moves and what is the name of this line?

- What is the relationship between the curve representing the function $f(x)$ and the line called Tangent?

- As point A moves what shape is the curve formed by the trace of the slope of the tangent at the point A?

- When the sliders have the following values: $a = 1$, $b = 1$, $c = -2$ and $d = 2$, describe the shape of the curve formed by the function $f(x)$.

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

7. Click the check box on the interactive file and note the equation of the derivative of the function $f(x)$.

8. What do you notice about the relationship between path followed the trace of the slope of the tangent at the point A as point A moves around the curve and the curve that represents the derivative of the function $f(x)$?

9. Change some or all of the sliders a, b, c and d and check if the relationship you noticed in the above question between the path followed by the trace of the slope of the tangent at the point A as A moves around the curve and the curve that represents the derivative of the function $f(x)$.

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

10. Can you conclude that the path followed by the trace of the slope of the tangent at the point A as A moves around the curve and the curve that represents the derivative of the function $f(x)$ are equal in all cases for a cubic curve?

11. Given a cubic curve what can you conclude about the shape of the derivative of this curve?

12. Given 0 multiplied by something is zero, by moving the sliders in the interactive file what can you conclude about the derivative of $f(x) = x^3$?

13. Find the derivatives of the following functions:

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

b. $f(x) = x^3 + 4x$

c. $f(x) = x^3 + x^2$

d. $f(x) = x^3 + 2x^2$

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

