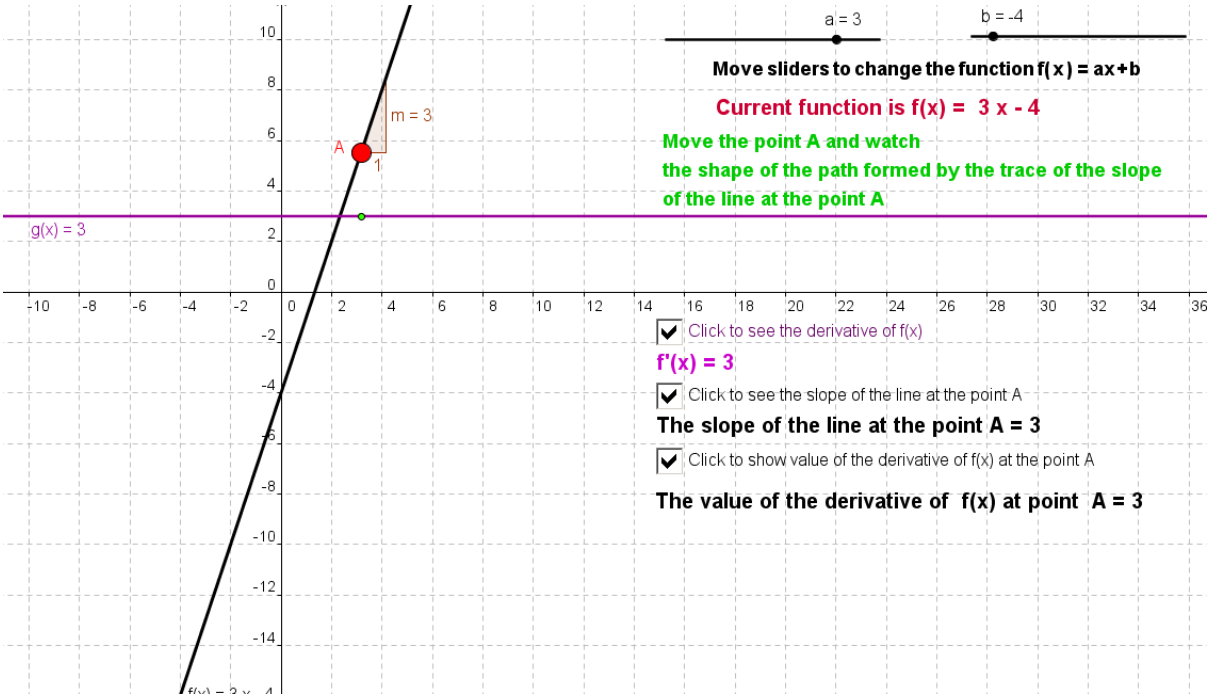
Student Activity: To investigate the Derivative of a Linear Function

Use in connection with the interactive file, 'Derivative of a Linear 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, what path does the point A follow and what shape is the path followed by the point A?

   _____

2. As the point A moves, what happens to the slope of the line?

   _____

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

   _____

4. Click the button and set the sliders to the following values: a = 3 and b = 1. Describe the graph of the function f(x).

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5. With the sliders at these values, move the point A and describe the path followed by the trace of the slope.

   _____

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

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7. Click the checkboxes to show the slope of the line at the point A and the value of the derivative of the function at the point A. As A moves along the curve of the function f(x), what do you notice about these values?

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8. What do you notice about the path followed by the trace of the slope of the line and the graph of the derivative of the function?

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9. Change sliders a and b, 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?

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

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_____

10. Given a linear function, what can you conclude about the graph of its derivative?

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11. What can you conclude about the derivative of a linear function and the slope of the graph of the function?

_____

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

_____

13. Find the derivatives of the following functions. (Check your answers using the interactive file.)

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

_____

b. $f(x) = 3x - 4$

_____

c. $f(x) = -3x + 1$

_____

d. $f(x) = 4 - 2x$

_____

e. $f(x) = x$

_____

14. What is the derivative of $f(x) = mx+c$?

_____

15. Draw the graphs of the function $f(x) = 2x+5$ and its derivative.

16. Draw the graphs of the function $f(x) = -2x +5$ and its derivative.