

Lesson 1.5: Average Rate of Change

Graph

$$y = mx + b$$

$$y = -2x + 3 \rightarrow y\text{-int.}$$

slope

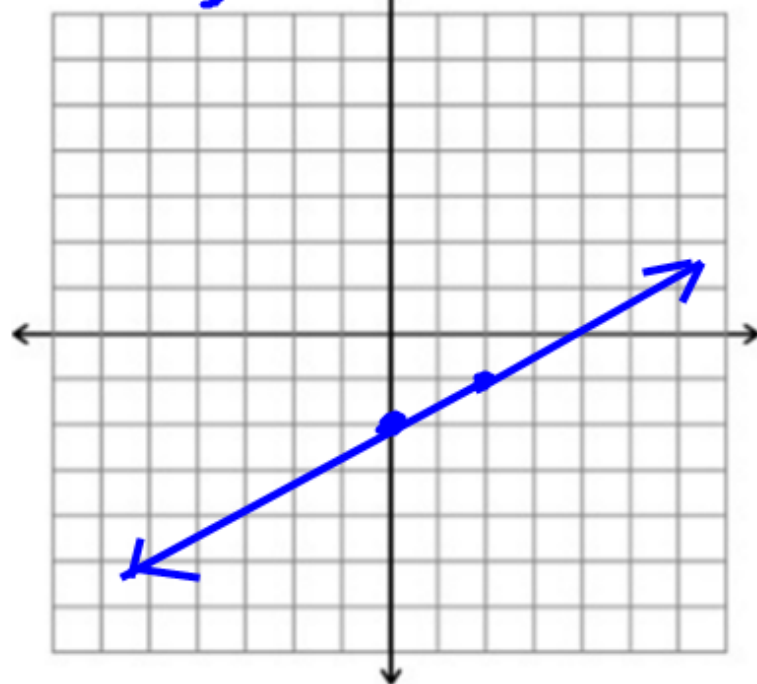
$$m = -\frac{2}{1}$$



$$\text{Slope} = \frac{\text{rise}}{\text{run}}$$

$$3x - 6y = 12$$

$$y = \frac{1}{2}x - 2$$



$$3x - 6y = 12$$

$$-3x$$

$$-3x$$

$$\frac{-6y}{-6} = \frac{-3x + 12}{-6}$$

$$y = \frac{1}{2}x - 2$$

Find the slope of the line that passes through the points $(-4, 7)$ and $(12, 1)$.

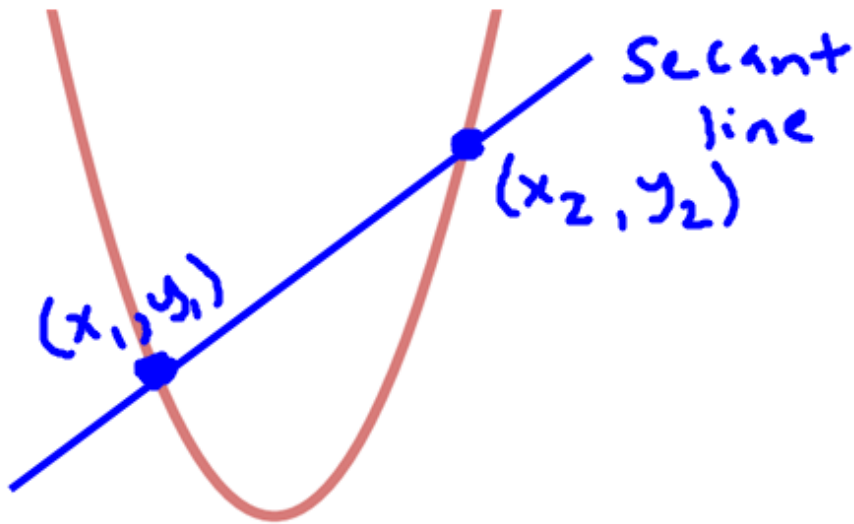
$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

x_1 y_1 x_2 y_2

$$m = \frac{1 - 7}{12 - (-4)} = \frac{1 - 7}{12 + 4} = \frac{-6 \div 2}{16 \div 2} = \frac{-3}{8}$$

Average Rate of Change

- * Average Rate of Change: the slope of the secant line.



$$* \frac{y_2 - y_1}{x_2 - x_1}$$

$$* \frac{f(x_2) - f(x_1)}{x_2 - x_1}$$

$$f(x_2) = y_2$$

$$f(x_1) = y_1$$

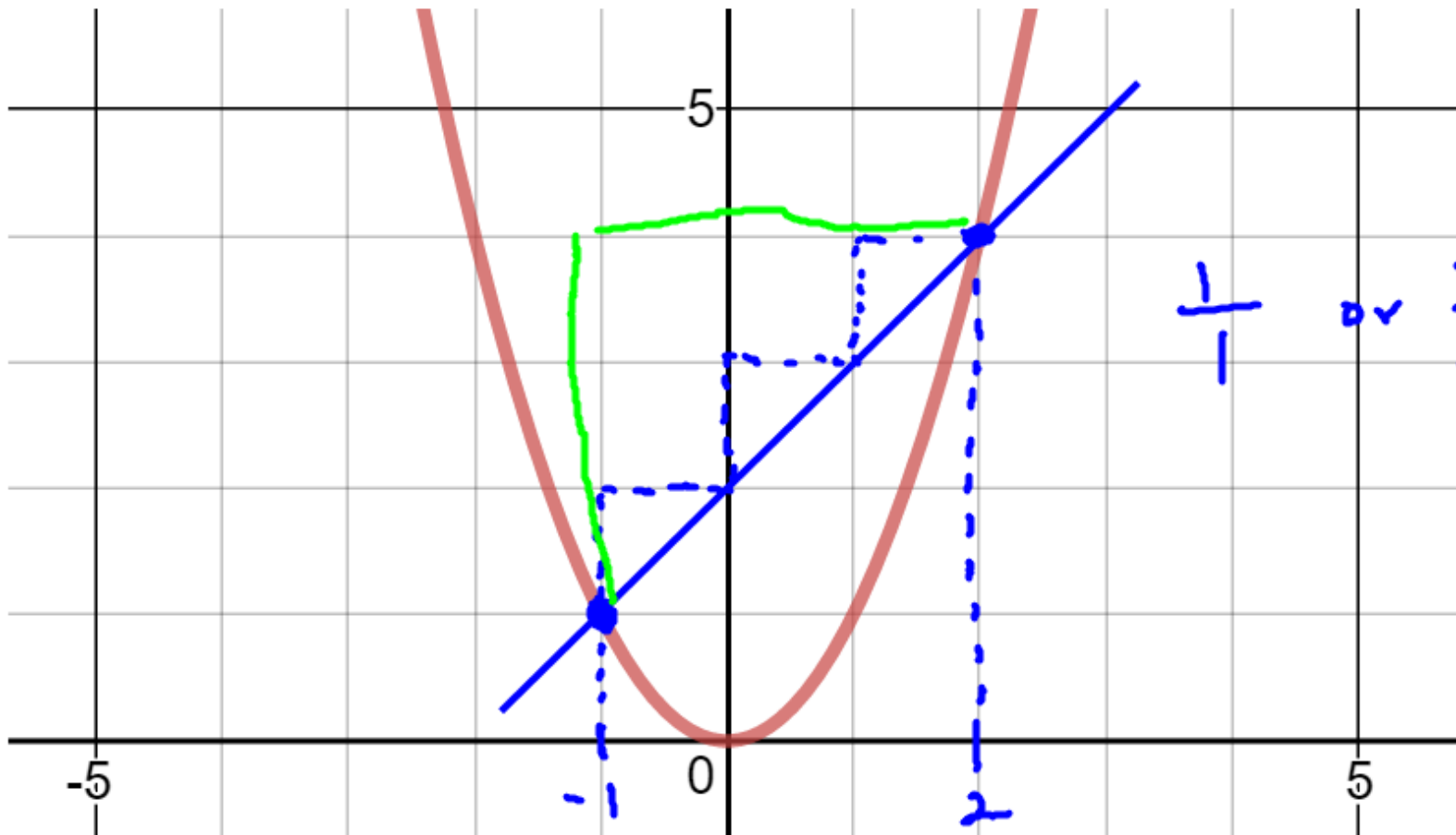
Find the average rate of change from -1 to 2.

x_1 x_2

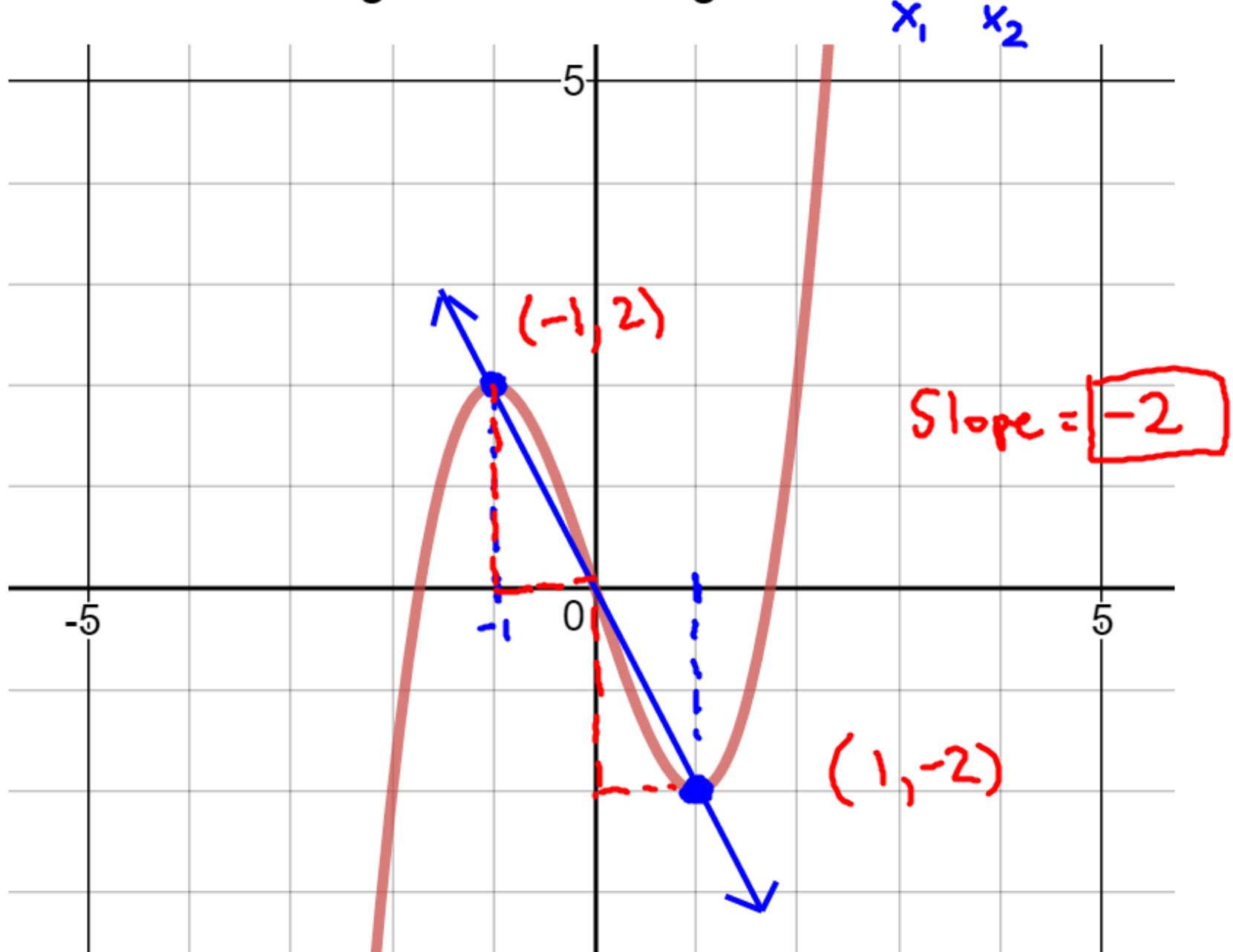
rise
run

$$\frac{1}{1} \text{ or } \frac{3}{3} = \boxed{1}$$

x



Find the average rate of change from x_1 to x_2 .



Find the average rate of change of $f(x) = x^2 - 5x + 1$

a) from 0 to 3

x_1 x_2

x	y
$x_1 0$	$y_1 \leftarrow (0)^2 - 5(0) + 1$
$x_2 3$	$y_2 \leftarrow (3)^2 - 5(3) + 1$

~~b) from -2 to 1~~

$$\frac{y_2 - y_1}{x_2 - x_1}$$

$$\frac{-5 - 1}{3 - 0} = \frac{-6}{3} = \boxed{-2}$$

Find the average rate of change of $h(x) = x^3 - x$

a) from x_1 to x_2
1 to 2

~~b) from 2 to 2~~

	x	y	
x_1	1	0	$\leftarrow (1)^3 - 1$
x_2	2	6	$\leftarrow (2)^3 - 2$

$$\frac{6-0}{2-1} = \frac{6}{1} = \boxed{6}$$