

Name: _____ Date: _____ Period: _____

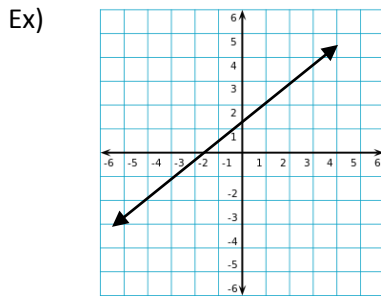
All About Slope

Slope describes the steepness of a line. Slope describes the *vertical change* compared to the *horizontal change*, given by the formula $\frac{\text{vertical change}}{\text{horizontal change}}$. Slope is often represented by the letter "m" from the word *montor*, which means to rise or to climb.

*Vertical looks at the y-values and means up (positive) or down (negative)

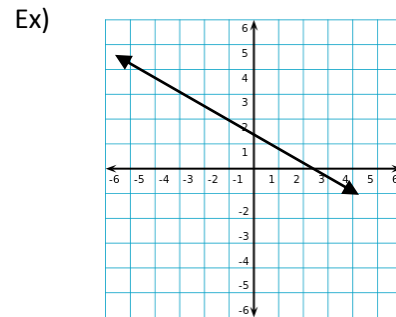
*Horizontal looks at the x-values and means right (positive) or left (negative)

A line that is **increasing** goes up from left to right.



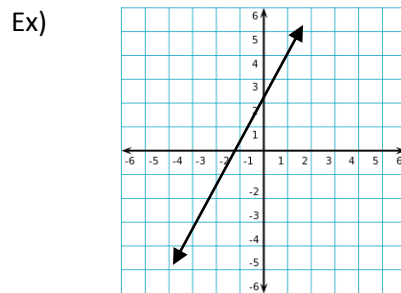
If a line is increasing, it will have a *positive* slope.

A line that is **decreasing** goes down from left to right.



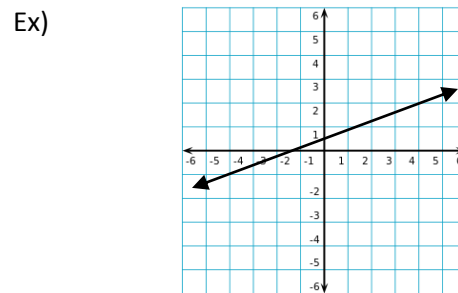
If a line is decreasing, it will have a *negative* slope.

A line that is **steep** will be more upright.



If a line is steep, the slope will be *greater than 1*.

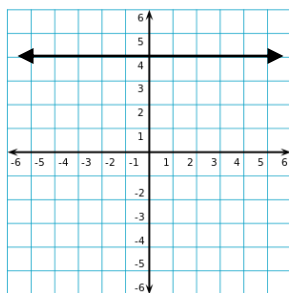
A line that is **not-so-steep** will be flatter.



If a line is not-so-steep, the slope will be *less than 1*.

*The steepness of a line does not depend on if it is positive or negative. You are just looking at the number (or the absolute value for the slope) to determine the steepness.

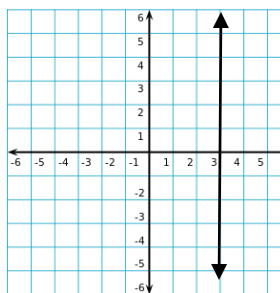
A horizontal line has no slope.



x	y
1	4
2	4
3	4
4	4

- Looking at a table of values, you can tell that the line is going to be horizontal if all of the y-values are the same.
- If two points have the same y-values, then the line will be horizontal.

A vertical line has a slope that is undefined.



x	y
3	-2
3	-1
3	0
3	1

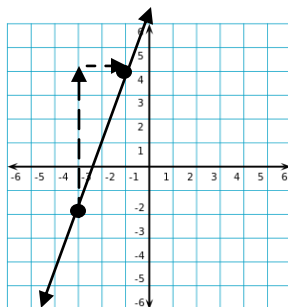
- Looking at a table of values, you can tell that a line is going to be vertical if all of the x-values are the same.
- If two points have the same x-values, then the line will be vertical.

There are THREE ways to find the slope of a line.

1. From a graph
2. From a table of values
3. From two coordinate points

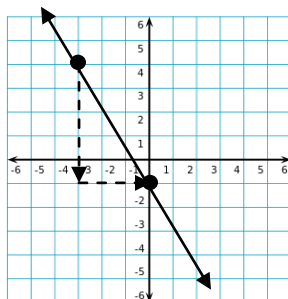
Finding Slope from a Graph

Ex) From the point on the left, to the point on the right, you move up 6 spaces, and to the right 2 spaces.



$$\text{Slope} = \frac{\text{vertical change}}{\text{horizontal change}} = \frac{\text{up } 6}{\text{right } 2} = \frac{6}{2} \div \frac{2}{2} = \frac{3}{1} = \boxed{3}$$

Ex) From the point on the left, to the point on the right, down 5 spaces, and to the right 3 spaces.



$$\text{Slope} = \frac{\text{vertical change}}{\text{horizontal change}} = \frac{\text{down } 5}{\text{right } 3} = \boxed{\frac{-5}{3}}$$

Finding Slope from a Table of Values

Ex) To find the slope from a table of values, find the change in the y-values over the change in the x-values.

	x	y	
+2	2	5	
	4	10	+5
+2	6	15	+5

The slope is given by $\frac{\text{vertical change}}{\text{horizontal change}} = \frac{\text{change in } y}{\text{change in } x} = \frac{5}{2}$

Because the slope is positive, the line will be increasing.

Because the slope is bigger than 1, it is going to be a steep

Ex) To find the slope from a table of values, find the change in the y-values over the change in the x-values.

	x	y	
-3	3	2	+2
	0	4	
-6	-6	8	+4

The slope is given by $\frac{\text{vertical change}}{\text{horizontal change}} = \frac{\text{change in } y}{\text{change in } x} = \frac{2}{-3}$

*This slope used the first set of changes. You could also use $\frac{4}{-6}$ as your slope, but must remember to simplify

Because the slope is negative, the line will be decreasing.

Because the slope is less than 1, the line is going to be not-so-steep.

*Remember, a negative divided by a negative equals a positive.

Finding Slope from Two Coordinate Points

Ex) Find the slope between the points (-2, 4) and (-6, -2).

$$\frac{\text{vertical change}}{\text{horizontal change}} = \frac{\text{change in } y}{\text{change in } x} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{4 - (-2)}{-2 - (-6)} = \frac{6}{4} = \frac{3}{2}$$

Because the slope is positive, the line will be increasing.

Because the slope is greater than 1, the line is going to be steep.

Additional Way

$$\begin{array}{l} (-2, 4) \\ \underline{-(-6, -2)} \\ (4, 6) \end{array} \quad \text{Slope} = \frac{6}{4} = \frac{3}{2}$$

Ex) Find the slope between the points (-6, 4) and (-4, 8)

$$\frac{\text{vertical change}}{\text{horizontal change}} = \frac{\text{change in } y}{\text{change in } x} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{4 - 8}{-6 - (-4)} = \frac{-4}{-2} = 2$$

Because the slope is positive, the line will be increasing.

Because the slope is greater than 1, the line is going to be steep.

Additional Way

$$\begin{array}{l} (-6, 4) \\ \underline{-(-4, 8)} \\ (-2, -4) \end{array} \quad \text{Slope} = \frac{-4}{-2} = 2$$