

Name: Key Date: _____

A Linear Equation is an equation that forms a straight line.

Linear Equations can be written in many forms. One of the most useful forms of linear equations is :

Slope-intercept form

It looks like : $y = mx + b$

Two very important characteristics of linear relationships can be seen in this equation:

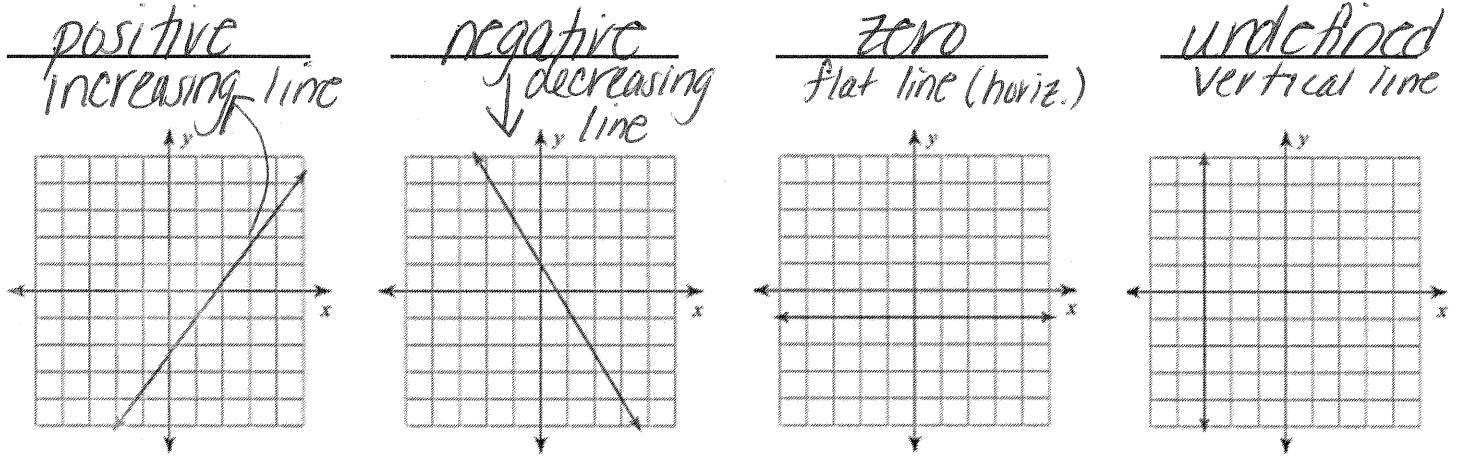
slope and y-intercept

$$y = \textcircled{m} x + \boxed{b}$$

SLOPE

Definition: the steepness of a line the constant rate of change shown in linear relationship.

Slope can be...



There are three ways that are often used for finding slope depending on the representation that you are given.

Slope = $m = \frac{\text{change in } y}{\text{change in } x} = \frac{\text{rise}}{\text{run}} = \frac{y_2 - y_1}{x_2 - x_1}$

Finding Slope from a TABLE: (the SAME as finding the rate of change) Use slope = $\frac{\text{change in } y}{\text{change in } x}$

X	Y
2	8
3	10
4	12
5	14

Slope: $\frac{2}{1} = 2$

X	Y
10	1
8	4
6	7
4	10

Slope: $\frac{3}{-2} = -\frac{3}{2}$

X	Y
-4	10
0	5
4	0
8	-5

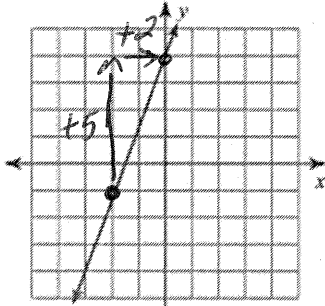
Slope: $\frac{-5}{4}$

Finding Slope from a graph Use slope = $\frac{\text{rise}}{\text{run}}$

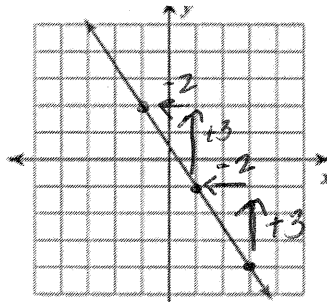
- 1) Find 2 points on the line.
- 2) determine the rise & run to get from 1 point to the next

* slope is the same from ANY two points

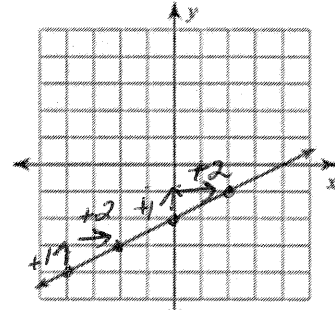
Examples:



Slope: $\frac{5}{2}$



Slope: $\frac{3}{-2}$



Slope: $\frac{1}{2}$

Finding Slope from 2 points: Use slope = $\frac{y_2 - y_1}{x_2 - x_1}$ given $(x_1, y_1)(x_2, y_2)$

Examples:

- 1) (x_1, y_1) (x_2, y_2)
1) (2,3) and (8,10)

- 2) (-3,5) and (2,0)

- 3) (-1,-2) and (-1, 4)

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{10 - 3}{8 - 2} = \frac{7}{4}$$

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{0 - 5}{2 - (-3)} = \frac{-5}{5} = -1$$

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{4 - (-2)}{-1 - (-1)} = \frac{-2}{-4} = \frac{1}{2}$$

Slope = $\frac{7}{4}$

Slope = -1

Slope = $\frac{1}{2}$

Finding slope from an equation in slope-intercept form:

Remember that the m is the slope

Examples:

1) $y = -2x - 5$

2) $x - 2y = 6$
solve for y
 $x - 2y = 6$
 $-x \quad -x$
 $\frac{-2y = -x + 6}{-2 \quad -2}$
 $y = \frac{1}{2}x - 3$

3) $y = x + 7$

4) $y = 4$

Slope: -2

Slope: $\frac{1}{2}$

Slope: 1

Slope: 0