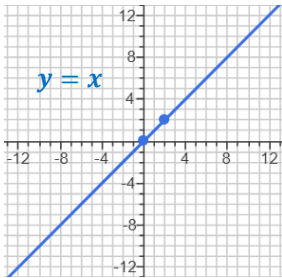


SLOPE

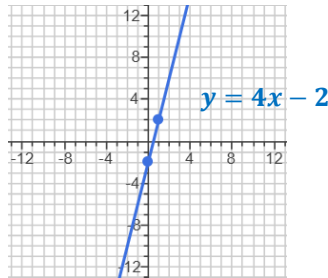
Last Updated: 7/24/19

Graphs with Positive Slope – Graph slants up from left to right.

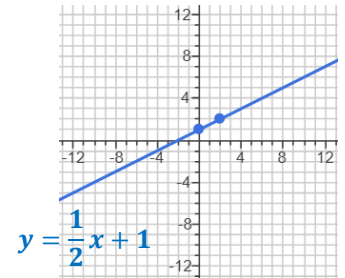
$m = 1$



$m = 4$

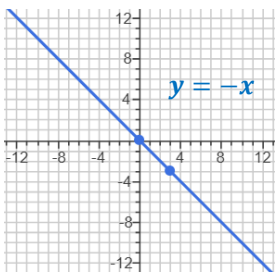


$m = \frac{1}{2}$

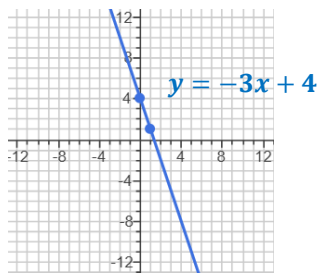


Graphs with Negative Slope – Graph slants down from left to right.

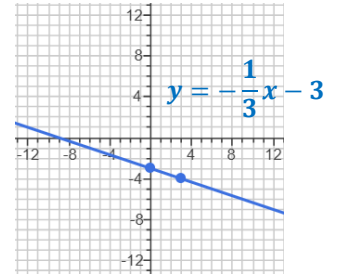
$m = -1$



$m = -3$

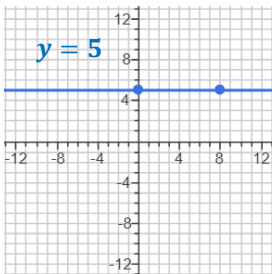


$m = -\frac{1}{3}$

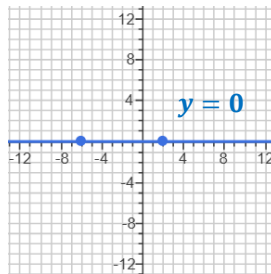


Graphs with Zero Slope – Graph is horizontal.

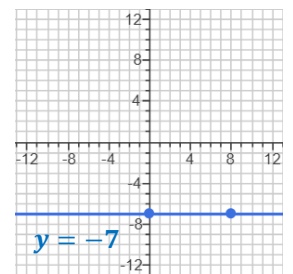
$m = 0$



$m = 0$

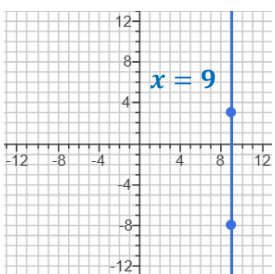


$m = 0$

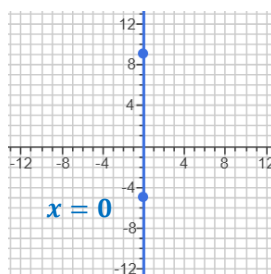


Graphs with Undefined Slope – Graph is vertical.

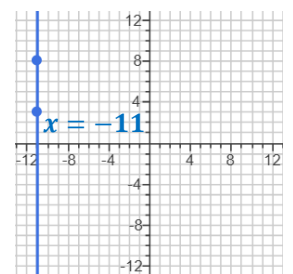
$m = \text{undefined}$



$m = \text{undefined}$



$m = \text{undefined}$



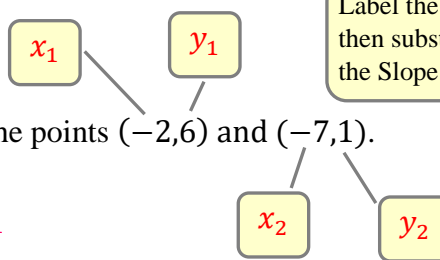
Slope Formula

The slope, m , is a *number* that represents the slant, or tilt, of the line. It can be '+', '-', decimal, or fraction. The slope is *not* a point.

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

When given *two points* and are asked to find the slope, use the **Slope Formula**.

Label the points then substitute into the Slope Formula.



Examples

Positive Slope:

Find the slope of the line containing the points $(-2, 6)$ and $(-7, 1)$.

$$m = \frac{1 - 6}{-7 - (-2)} \Rightarrow \frac{-5}{-7 + 2} \Rightarrow \frac{-5}{-5} \Rightarrow m = 1$$

Negative Slope:

Find the slope of the line containing the points $(-6, 11)$ and $(0, 1)$.
 x_1, y_1 x_2, y_2

$$m = \frac{1 - 11}{0 - (-6)} \Rightarrow \frac{-10}{6} \Rightarrow \frac{-5}{3} \Rightarrow m = -\frac{5}{3}$$

Zero Slope:

Find the slope of the line containing the points $(4, 5)$ and $(0, 5)$.
 x_1, y_1 x_2, y_2

$$m = \frac{5 - 5}{0 - 4} \Rightarrow \frac{0}{-4} \Rightarrow m = 0$$

Undefined Slope:

Find the slope of the line containing the points $(-3, 6)$ and $(-3, -6)$.
 x_1, y_1 x_2, y_2

$$m = \frac{-6 - 6}{-3 - (-3)} \Rightarrow \frac{-12}{-3 + 3} \Rightarrow \frac{-12}{0} \Rightarrow m = \text{undefined}$$

Slope-Intercept Formula

When given an *equation* and are asked to find the slope, use the **Slope-Intercept Formula**.

$$y = mx + b$$

The *number and sign* touching x on its left side is the slope, m .

The letter b represents the y -coordinate of the y -intercept, $(0, b)$.

The '+' in front of the b in the formula is a generic plus sign.

The b itself can be positive, negative, or zero. If b is zero, it will not be listed in the original equation: $y = mx$.

Examples

Find the slope and y -intercept.

$$y = -5x$$

The *number and sign* touching x on its left side is the slope. That number is -5 . *Do not* include the x in your answer. The y -intercept is $(0, 0)$.

Find the slope and y -intercept.

$$y = 1.57x - 4$$

The slope can be a decimal or a fraction. Here, $m = 1.57$. The y -intercept is $(0, -4)$.

Find the slope and y -intercept.

$$y = -3 - x$$

The slope is -1 , since that is the *number and sign* touching x on its left side. The y -intercept is $(0, -3)$. The two terms have simply been switched.

Your Turn

Find the slope, if any, and y -intercept.

a) $y = 10$

b) $x = -6$

Answers:

a) $m = 0$, y -intercept is $(0, 10)$.

b) $m = \text{undefined}$.