

Graphing Linear Lines

Using a T-chart or Plotting Points

One way to graph any equation is to make a table of x values versus y values, once a table is made, the points are plotted on a coordinate system with a line is drawn through the points. It is best to have at least three points for a linear function. To get the y -values, pick any three x -values (include positives and negatives). Substitute these values (one at a time) in for x in the equation and solve for y .

Example: Graph $3x+2y=6$

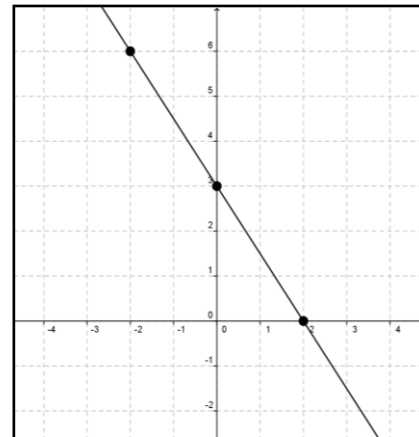
We will rearrange the equation so it is in $y=mx+b$ form, but it is not necessary to do so.

$3x+2y=6$ is the same as $y = -\frac{3}{2}x + 3$

We then make the T-chart

x	y
-2	$= -\frac{3}{2}(-2) + 3 = 6$
0	$= -\frac{3}{2}(0) + 3 = 3$
2	$= -\frac{3}{2}(2) + 3 = 0$

We then plot the x and y -values and connect the dots



Using the X and Y-Intercepts

Another way to graph a line is to identify the x and y -intercepts. Once you have these, plot them and connect with a straight line.

To find the x -intercept: Set $y=0$ and solve for x . The x -intercept can be written as $(x,0)$

To find the y -intercept: set $x=0$ and solve for y . The y -intercept can be written as $(0,b)$

Example: Graph $2x+y=4$

x-intercept

Set $y=0$

$$2x+0=4$$

Solving for x , we get $x=2$

The x -intercept is $(2,0)$

y-intercept

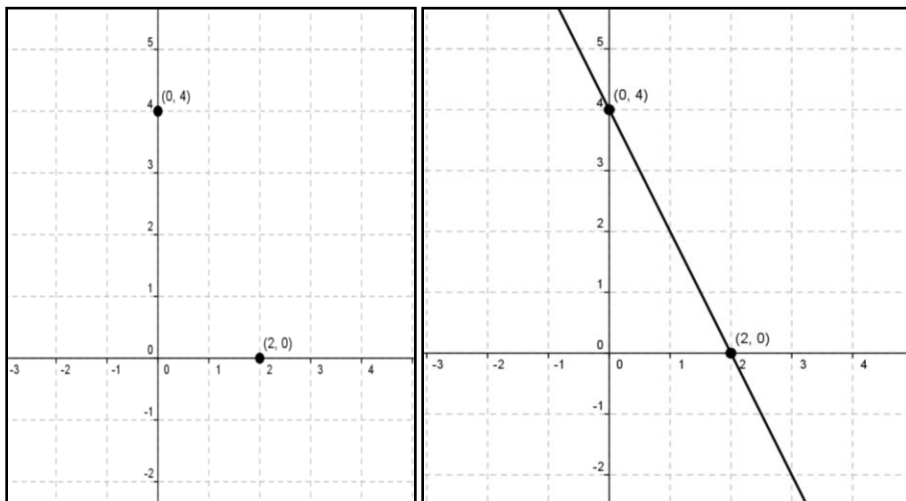
Set $x=0$

$$2(0)+y=4$$

Solving for y , we get $y=4$

The y -intercept is $(0,4)$

Plotting these points and connecting them, we have



Graph Using the Slope and Y-Intercept

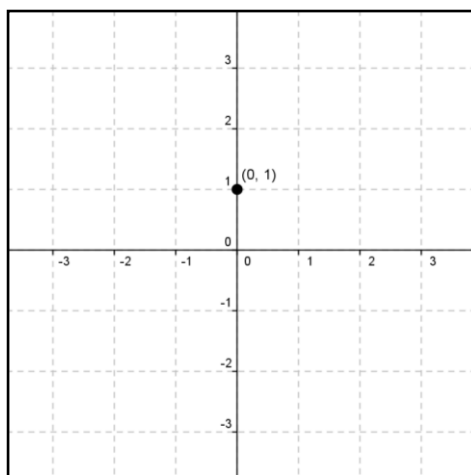
When you have an equation in the form of $y=mx+b$, one of the easiest way to graph it is to plot the y-intercept and using the slope to plot more points. Once you have two points, draw a line through the points.

Remember that for $y=mx+b$, that the m is the slope and the b is the y-intercept (which in ordered pair form is $(0,b)$). Slope means rise over run. The top number is how much you go up, and the run is how much you go to the right. If your slope is negative, you will go down (instead of up) for the rise and you still go to the right for the run.

Example: Graph $y=-2x+1$.

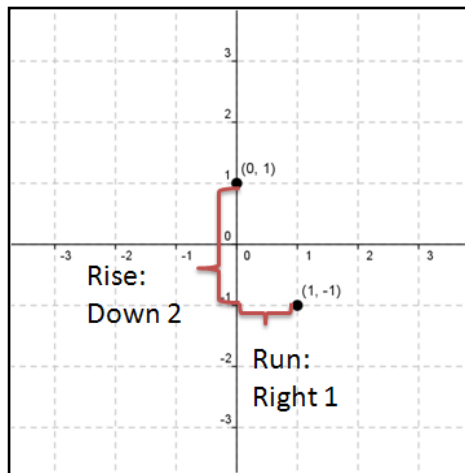
We can see that the slope is -2 and the y-intercept as an ordered pair is $(0,1)$.

First we will plot $(0,1)$

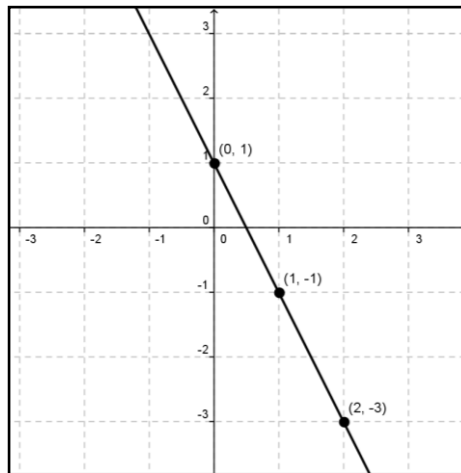


Now our slope is -2 . This is the same as $\frac{-2}{1}$.

Our rise is -2 and our run is 1 . This means that from our y -intercept of $(0,1)$ we will move down 2 and go 1 to the right. This is the location of another point. Keep repeating this step.



Connecting the dots and we have our graph!



Important Notes:

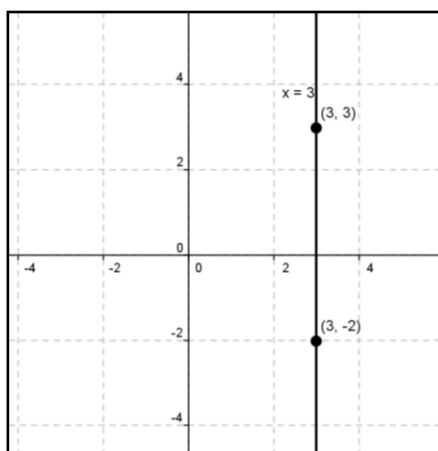
- While it really doesn't matter if the negative sign of the slope goes to the numerator or the denominator, it easiest to have it go with the numerator. The negative sign will NOT go to both the numerator and denominator.
- A negative slope makes the line go down left to right and a positive slope makes the line up left to right.

Graphing a Vertical Line

A vertical line comes in the form of $x=k$, where k is a real number. To graph it, plot two points that have the same x -value, and then connect the dots.

Example: Graph $x=3$

We can pick any two points as long as the x-value is 3. Let's use (3,-2) and (3,3). We plot these points and connect the line.



Graphing a Horizontal Line

A vertical line comes in the form of $y=k$, where k is a real number. To graph it, plot two points that have the same y -value, and then connect the dots.

Example: Graph $x=-1$

We can pick any two points as long as the y -value is -1. Let's use (2,-1) and (-3,-1). We plot these points and connect the line.

