Summary of Graphing Lines

We learned a few ways to graph lines. It's nice to write a summary on when to use which method. The following is by the instructor's personal preference. You can use your own preference as long as you can correctly graph lines. Note that you will achieve mastery of graphing lines if you can use all of the following methods.

1. If the line is given in slope-intercept form and if the slope is not a fraction, like $y=-2x+3$, the easiest way is to build a table and find at least two points. See Example 1.
2. If the line is given in slope-intercept form and if the slope is a fraction, like $y=-\frac{2}{3}x+3$, the easiest way is to graph the *y*-intercept and then draw a few slope triangles. See Example 2.
3. If the line is given in standard form and if the right side is not 0, like $2x+3y=6$, the easiest way is to find the line's *x*-intercept and *y*-intercept to graph it. See Example 3.
4. If the line is given in standard form and if the right side is 0, like $2x+3y=0$, or if the third method generated fractional coordinates, the easiest way would be to change the equation to slope intercept form, and then use the second method. See Example 4.
5. For vertical and horizontal lines, like $y=2$ and $x+3=0$, the easiest way is to build a table and find two points. See Example 5.

[**Example 1**] Graph $y=-2x+3$.

[**Solution**] We build a table and find two points. We could find more points, but two points are enough to graph a line.

***x* values**	***y* values**	**points**
0	$y=-2x+3=-2\cdot 0+3=3$	(0, 3)
1	$y=-2x+3=-2\cdot 1+3=1$	(1, 1)

Graph of the line is on the next page.

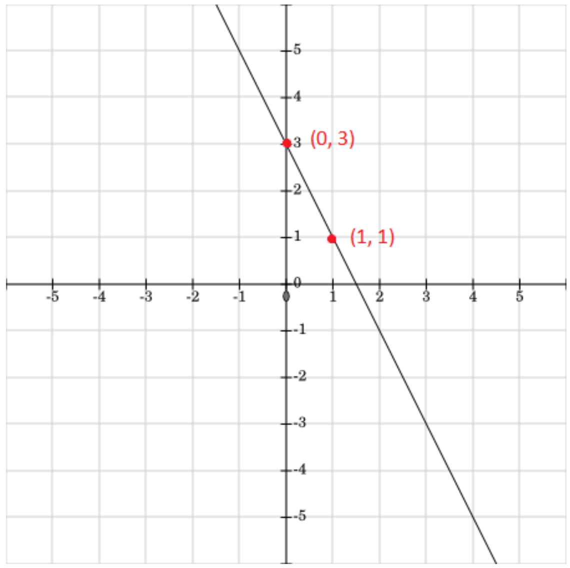

Figure 1: Graph of y=-2x+3

[**Example 2**] Graph $y = -\frac{2}{3}x + 3$.

[**Solution**] We first identify this line's *y*-intercept: (0, 3). Then, using a slope triangle with rise= -2 and run=3, we can locate another point on the line. Draw a few more slope triangles and identify a few more points. Finally, connect all points and extend both ways to graph the line.

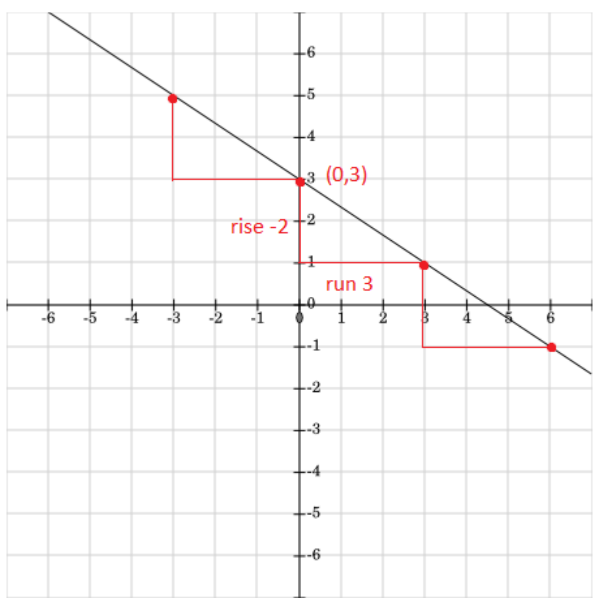

Figure 2: Graph of y=-2/3 x+3

[**Example 3**] Graph the line $2x+3y=6$.

[**Solution**] Plug *x*=0 into $2x+3y=6$, and we have:

$$\begin{aligned} 2x+3y&=6 \\ 2\cdot 0+3y&=6 \\ 3y&=6 \\ \frac{3y}{3}&=\frac{6}{3} \\ y&=2 \end{aligned}$$

The first point we found is (0, 2), which is the *y*-intercept.

Next, plugging *y*=0 into $2x+3y=6$, and we have:

$$\begin{aligned} 2x+3y&=6 \\ 2x+3\cdot 0&=6 \\ 2x&=6 \\ \frac{2x}{2}&=\frac{6}{2} \\ x&=3 \end{aligned}$$

The second point we found is (3, 0), which is the *x*-intercept.

Connect (0, 2) and (3, 0) and then extend both ways, and we have the line's graph.

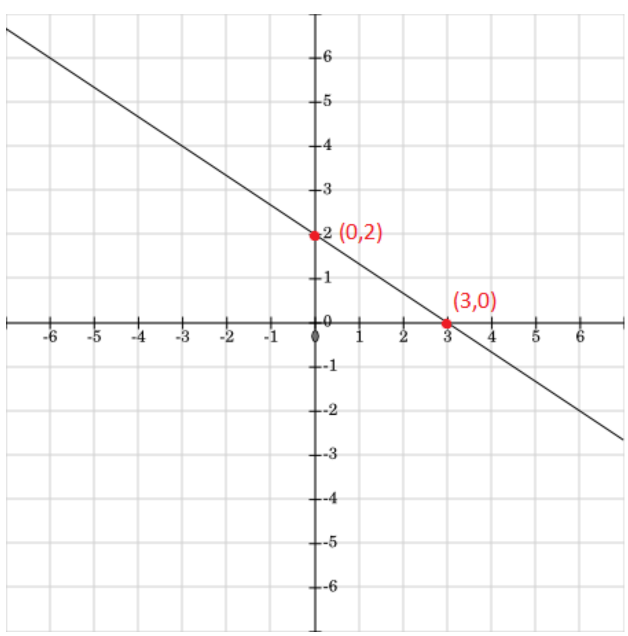

Figure 3: Graph of 2x+3y=6

[**Example 4**] Graph the line $2x + 3y = 0$.

[**Solution**] We change the equation to slope-intercept form:

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

Now we can graph this line by its *y*-intercept (0, 0) and slope triangles:

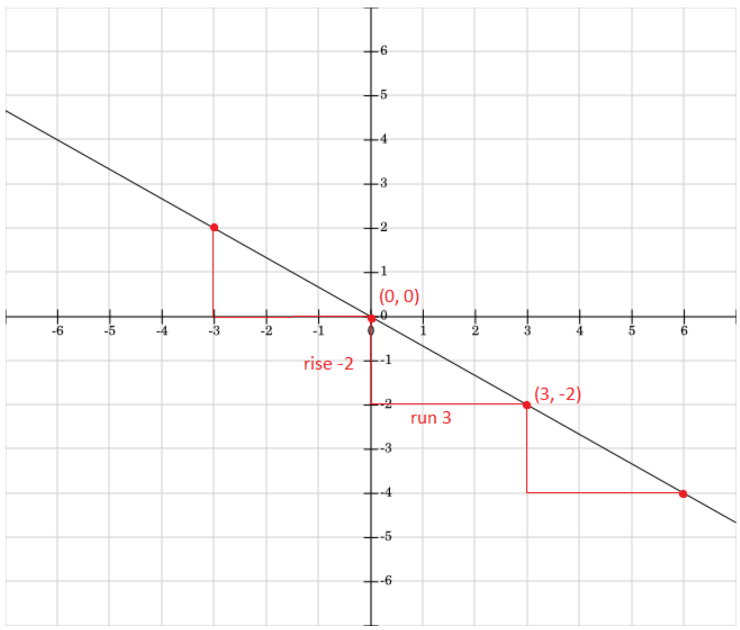

Figure 4: graph of 2x+3y=0

[**Example 5**] Graph $y = 2$ and $x + 3 = 0$.

[**Solution**] Build a table for each line. Note that we changed $x + 3 = 0$ into $x = -3$.

Table for $y = 2$:

x-values	**y-values**	**points**
0	2	(0, 2)
1	2	(1, 2)

Table for $x = -3$:

x-values	**y-values**	**points**
-3	0	(-3,0)
-3	1	(-3,1)

Solution:

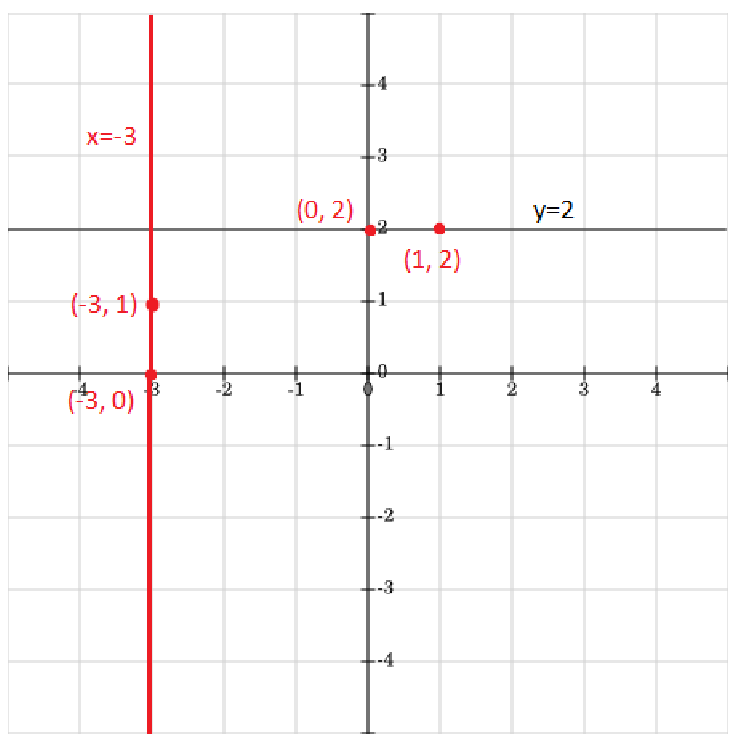

Figure 5: graphs of y=2 and x+3=0