## Graphing a Line With a Point and Slope

Earlier, we learned how to graph a line by building a table and plotting points. Now let's learn an easier way. When a line's equation is given in **Slope-Intercept Form,** which is ***y = mx + b*** , we can graph this line in the following steps:

1. Graph the point (0, *b*). This is the first point on the line.
2. Interpret the slope *m* as $m = \frac{rise}{run}$. Starting from (0, *b*), go up/down by the rise and go right by the run to locate a second point on the line. Optionally, draw a few more such slope triangles and locate more points on the line.
3. Connect all points and extend both ways to graph the line.

The next two pages have two examples.

[**Example 1**] Graph $y = -\frac{1}{2}x + 3$

[**Solution**] **Step 1**: Graph the *y*-intercept (0, 3).

**Step 2**: We interpret the slope $-\frac{1}{2}$ as $\frac{-1}{2}$. Starting from the point (0, 3), we rise by -1 unit (going down by 1 unit), and then run right by 2 units. Note that for *x* values, the right direction is the positive direction. Since 2 in the slope $\frac{-1}{2}$ is positive, we run right. We will reach the point (2, 2). Locate a few more points on the line by drawing a few more such slope triangles.

**Step 3**: Connect (0, 3) and (2,2), extend in both directions. We have our line!

Solution:

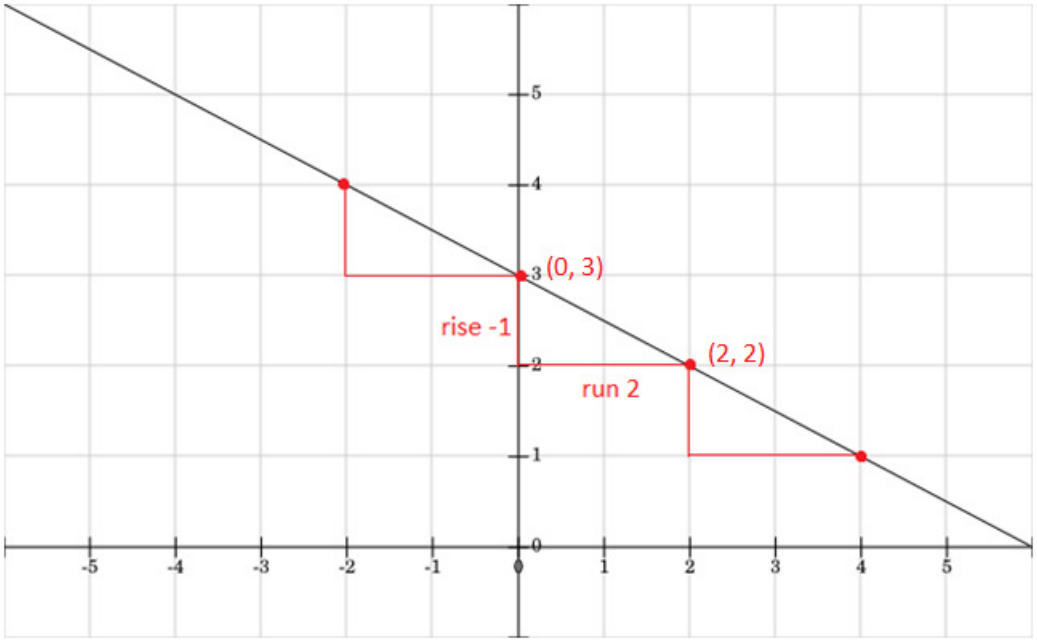


Figure 1: Graph of y=(-1/2)x+3

See next page for Example 2.

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

[**Solution**] **Step 1**: Graph the *y*-intercept (0, -1).

**Step 2**: We interpret the slope 3 as $\frac{3}{1}$. Starting from the point (0, -1), we rise by 3 unit (going up by 3 units), and then run right by 1 unit. We will reach the point (1, 2). Draw a few more such slope triangles and locate a few more points on the line.

**Step 3**: Connect (0, -1) and (1,2), extend in both directions. We have our line!

Solution:

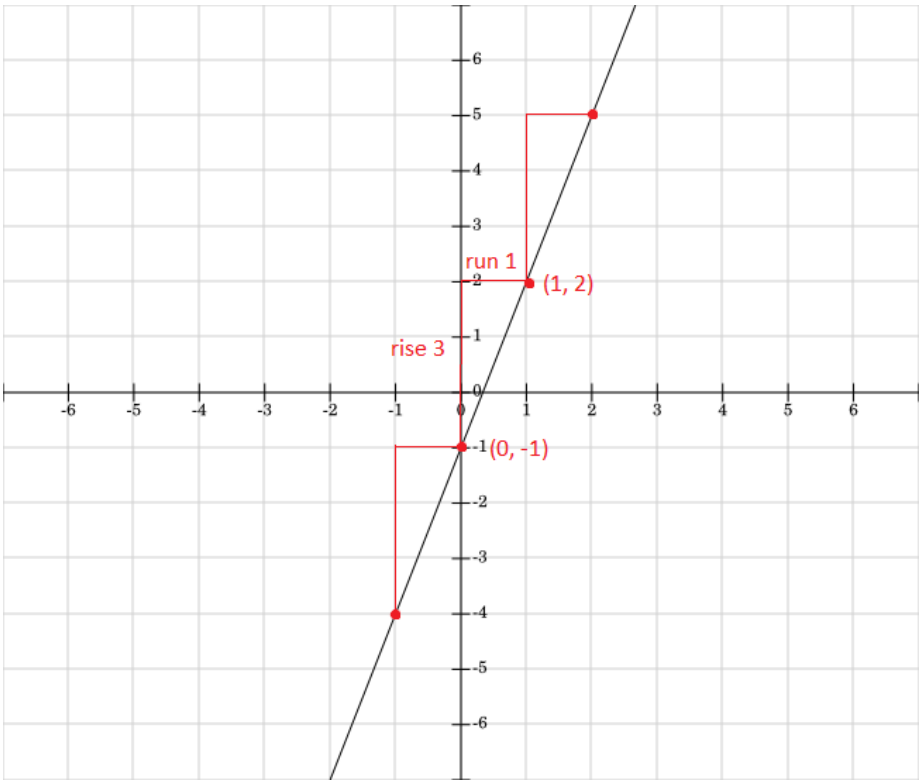


Figure 2: Graph of y=3x-1