

There are several forms that the equation of a line can take. They may look different, but they all describe the same line. A line can be described by many equations. All (linear) equations describing a particular line, however, are equivalent.

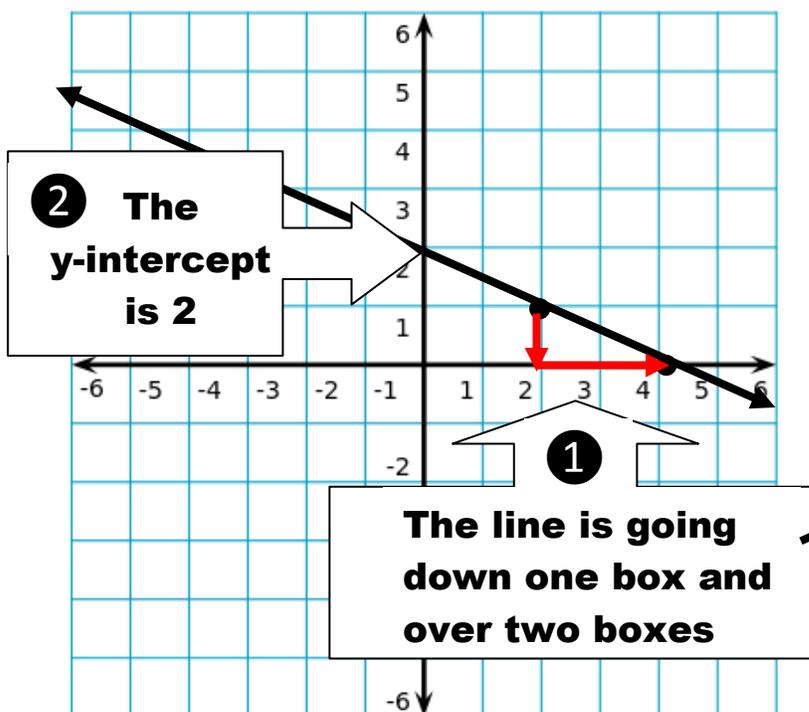
The first of the forms for a linear equation is slope-intercept form. Equations in slope-intercept form look like this:

$$y = mx + b$$

Where  $m$  is the slope of the line and  $b$  is the y-intercept of the line, or the y-coordinate of the point at which the line crosses the y-axis.

- 1 To write an equation in slope-intercept form, given a graph of that equation, pick two points on the line and use them to find the slope (you can use rise over run or the slope formula). This is the value of  $m$  in the equation.
- 2 Next, find where it crosses the y-axis. This is the value of  $b$  in the equation.
- 3 Finally, write the equation, substituting numerical values in for  $m$  and  $b$ . Check your equation by picking a point on the line (not the y-intercept) and plugging it in to see if it satisfies the equation.

**Example:** Write an equation of the following line in slope-intercept form:



We read graphs like we do words in a book. We read them left to right. So, from left to right, this line is going DOWN. That tells us it will have a NEGATIVE slope.

Slope is:  $\frac{\text{rise}}{\text{run}}$

So, the slope of this line is:  $-\frac{1}{2}$

- 3 The equation of the line in slope-intercept form is:  $y = -\frac{1}{2}x + 2$

**Helpful videos:**

<https://www.khanacademy.org/math/algebra/x2f8bb11595b61c86:linear-equations-graphs/x2f8bb11595b61c86:slope/v/slope-of-a-line>

<https://www.khanacademy.org/math/algebra/x2f8bb11595b61c86:linear-equations-graphs/x2f8bb11595b61c86:slope/v/introduction-to-slope>