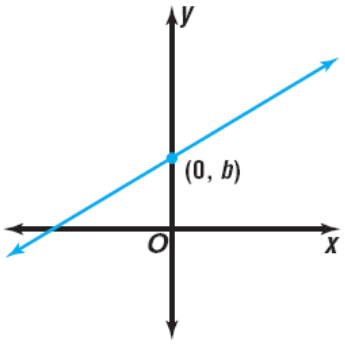
Writing Equations in Slope – Intercept Form

You learned how to write an equation in point-slope form by using the slope and a point on the line, and two points on the line. You can also write an equation of a line if you know the slope and *y*-intercept. Consider the graph below, which crosses the *y*-axis at (0, *b*).

$$(y - y_1) = m(x - x_1)$$

$$(y - b) = m(x - 0)$$
$$y - b = m(x - 0)$$
$$y - b = mx$$
$$y - b + b = mx + b$$
$$y = \underset{\text{slope}}{m}\ x + \underset{y-\text{intercept}}{b}$$



Definition 1: Slope/Intercept Equation of a Line: Given the slope m and *y*-intercept b of a line, the slope-intercept form of an equation of the line is $y = mx + b$.

Example 1: Find the slope and the *y*-intercept of the line $4x + 4y - 16 = 0$.

$$4x + 4y - 16 = 0$$
$$\Rightarrow 4y = -4x + 16$$
$$\Rightarrow \frac{4y}{4} = \frac{-4x}{4} + \frac{16}{4}$$
$$\Rightarrow y = -x + 4$$

$$\left.\begin{matrix} y = -x + 4 \\ y = mx + b \end{matrix}\right\} \Rightarrow \begin{cases} m = -1 \\ b = 4 \end{cases}$$

Therefore, the slope is -1 and the y-intercept is 4.

Rule 1: Finding the slope of a line given a linear equation:
Step 1: Solve the equation for *y*.
Step 2: The slope is the coefficient times *x*.