

**Writing Equations of Lines**

The equation of a line can be found if you know the slope of the line and a point on the line. To find the equation, you will use the **point-slope formula**.

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

where  $m$  = slope of the line and  $(x_1, y_1)$  is the point on the line

Example: **Given a point and the slope**

1. Find the equation of the line with a slope of 3 that passes through  $(-1, 5)$ .

Start with the formula:  $y - y_1 = m(x - x_1)$

Plug in the values:  $y - (5) = 3(x - (-1))$

Adjust any signs:  $y - 5 = 3(x + 1)$

Distribute the 3:  $y - 5 = 3x + 3$

Add 5 to both sides  $y = 3x + 8$

(to solve for  $y$ )

Answer:  $y = 3x + 8$

2. Find the equation of the line with a slope of 4 that passes through  $(3, -2)$ .

$$\begin{array}{lcl}
 m = 4 & & y - y_1 = m(x - x_1) \\
 (3, -2) & & y + 2 = 4(x - 3) \\
 & & y + 2 = 4x - 12 \\
 & & \begin{array}{r} -2 \qquad -2 \\ \hline y = 4x - 14 \end{array}
 \end{array}$$