

$$\text{slope} = \frac{\Delta y}{\Delta x}$$

$$\frac{(x-x_1)(y-y_1)}{x-x_1} = m(x-x_1)$$

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

$$+ y_1 \quad + y_1$$

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

Writing Equations based on a point and slope:

Use the information provided to determine the linear equation in slope-intercept form.

1. Given $m = -\frac{1}{4}$ and the point $(-4, 2)$.

$$m = -\frac{1}{4}$$

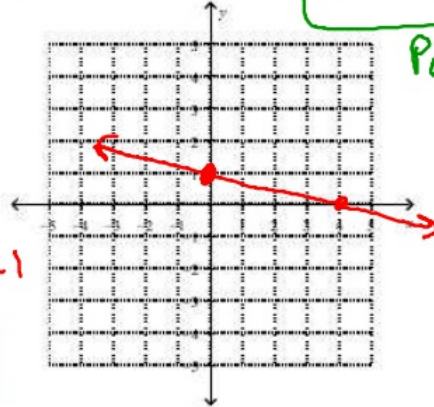
$$(x_1, y_1) = (-4, 2)$$

$$y = 2 + -\frac{1}{4}(x - (-4))$$

$$y = 2 - \frac{1}{4}(x + 4)$$

$$y = 2 - \frac{1}{4}x - 1$$

$$y = -\frac{1}{4}x + 1$$



Point-Slope Equation

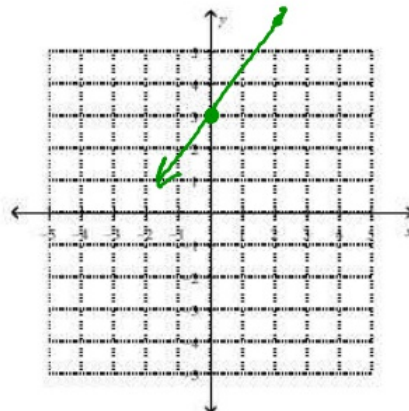
2. Given $m = \frac{3}{2}$ and the point $(-2, 0)$.

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

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

$$y = \frac{3}{2}(x + 2)$$

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



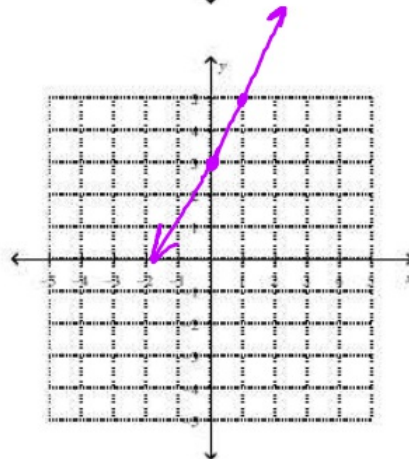
3. Given $m = 2$ and the point $(-4, -5)$.

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

$$y = -5 + 2(x + 4)$$

$$y = -5 + 2x + 8$$

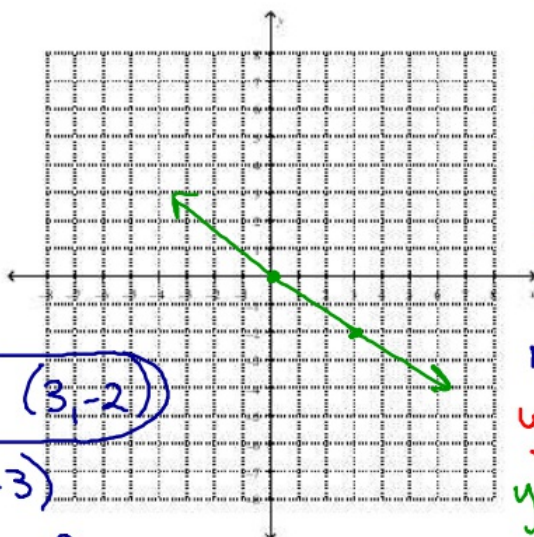
$$y = 2x + 3$$



Writing Equations based on 2 points:

1. Graph a line that goes through the following 2 points, $(-3, 2)$, $(3, -2)$ and write the equation.

- (1) Find slope
(2) Pick a pt
(3) Plug into pt + slope
(4) Solve for y



$$\begin{matrix} y & y \\ (-3, 2) & (3, -2) \\ x & x \end{matrix}$$

$$\text{slope} = m = \frac{2 - (-2)}{-3 - 3} = \frac{4}{-6} = -\frac{2}{3}$$

$$m = -\frac{2}{3} \quad \begin{matrix} (-3, 2) \\ x_1 \quad y_1 \end{matrix}$$

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

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

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

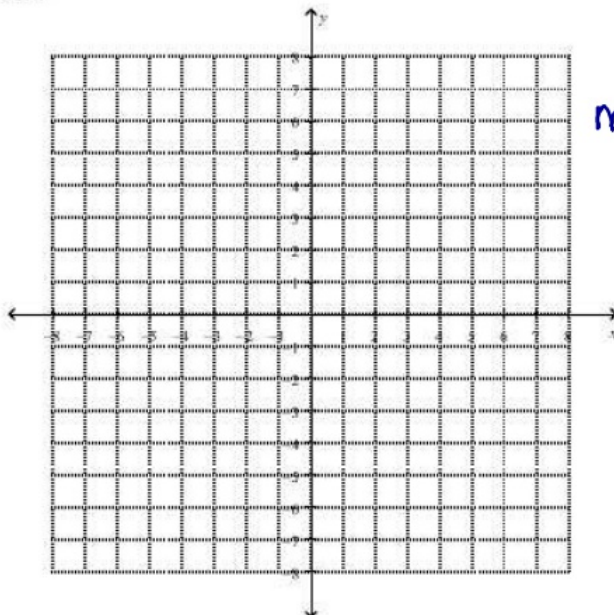
$$y = -\frac{2}{3}x$$

$$m = -\frac{2}{3} \quad (3, -2)$$

$$y = -2 - \frac{2}{3}(x - 3)$$

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

2. Graph a line that goes through the following 2 points $(-4, -5)$, $(-3, -3)$ and write the equation.



$$m = \frac{-5 - (-3)}{-4 - (-3)} = \frac{-5 + 3}{-4 + 3} = \frac{-2}{-1} = 2$$

$$(-4, -5) \quad m = 2$$

$$y = -5 + 2(x + 4)$$

$$y = -5 + 2x + 8$$

$$y = 2x + 3$$