

9/21 - Writing Equations of Lines

3 formulas to know:

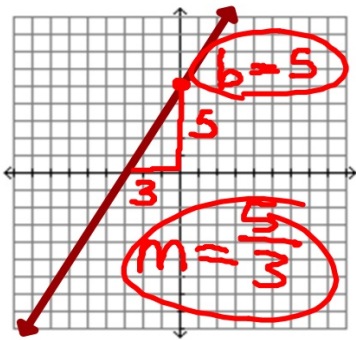
Slope: $m = \frac{y_2 - y_1}{x_2 - x_1} \quad \frac{\Delta y}{\Delta x}$

Slope-Intercept: $y = mx + b$

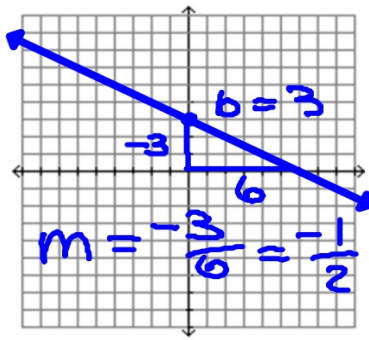
Point-Slope: $y - y_1 = m(x - x_1)$

$$y - y_1 = \frac{y_2 - y_1}{x_2 - x_1} (x - x_1)$$

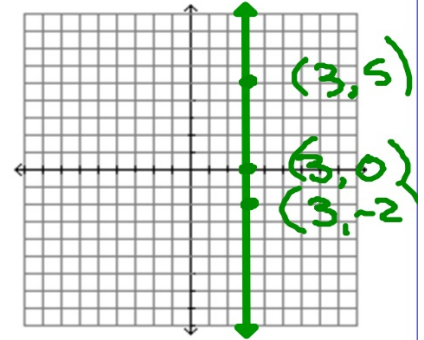
Write the equation, in slope-intercept form, of the line in the graph



$$y = mx + b$$
$$y = \frac{5}{3}x + 5$$



$$y = mx + b$$
$$y = -\frac{1}{2}x + 3$$



$$x = 3$$

Write the equation of the line, in slope-intercept form, of the line with the given slope that goes through the given point.

$$\begin{array}{c} x_1, y_1 \\ (-2, 3) \end{array} m = 4$$

Method 1: $y = mx + b$

$$\begin{array}{l} 3 = 4(-2) + b \\ 3 = -8 + b \\ \begin{array}{cc} +8 & +8 \end{array} \\ 11 = b \end{array}$$

$$\boxed{y = 4x + 11}$$

Method 2: $y - y_1 = m(x - x_1)$

$$\begin{array}{l} y - 3 = 4(x - (-2)) \\ y - 3 = 4x + 8 \\ \begin{array}{cc} +3 & +3 \end{array} \end{array}$$

$$\boxed{y = 4x + 11}$$

$$(-3, 4) \quad m = -\frac{1}{2}$$

Method 1: $y = mx + b$

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

$$\frac{8}{2} \cancel{4} = \frac{3}{2} + b$$

$$-\frac{3}{2} \quad -\frac{3}{2}$$

$$\frac{5}{2} = b$$

$$y = -\frac{1}{2}x + \frac{5}{2}$$

Method 2: $y - y_1 = m(x - x_1)$

$$y - 4 = -\frac{1}{2}(x + 3)$$

$$y - 4 = -\frac{1}{2}x - \frac{3}{2}$$

$$+4 \quad +\frac{8}{2}$$

$$y = -\frac{1}{2}x + \frac{5}{2}$$

Write the equation of the line, in slope-intercept form, going through the 2 given points.

$$(-2, 1) (4, -3)$$

$$m = \frac{1 - (-3)}{-2 - 4}$$
$$= \frac{4}{-6}$$
$$= -\frac{2}{3}$$

$$m = \frac{-3 - 1}{4 - (-2)}$$
$$= \frac{-4}{6}$$
$$= -\frac{2}{3}$$

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

$$y - 1 = -\frac{2}{3}(x + 2)$$

$$y - 1 = -\frac{2}{3}x - \frac{4}{3}$$
$$+1 \qquad +\frac{3}{3}$$

$$y = -\frac{2}{3}x - \frac{1}{3}$$

Homework:

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due Friday