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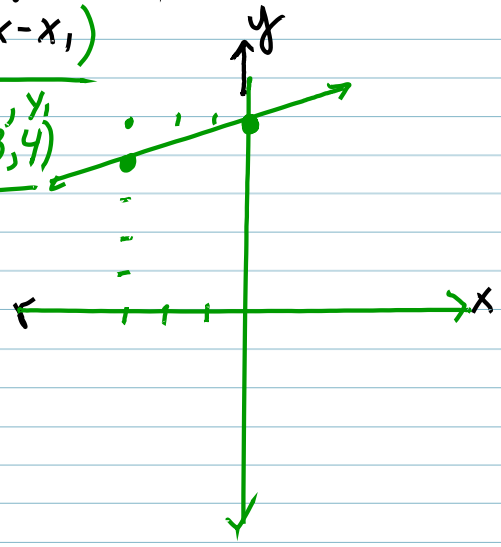
Algebra with Deborah Joya

Using the point-slope formula

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

"Graph a line passing through $(-3, 4)$ having a slope of $\frac{1}{3} = m$

Express the equation in
a) slope-intercept form and
b) standard form



slope

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

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

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

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

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

$+4 \quad +4$

$y = \frac{1}{3}x + 5$ slope-intercept form

Standard form $Ax + By = C$

$y = \frac{1}{3}x + 5$

$-\frac{1}{3}x \quad -\frac{1}{3}x$

not fractions

"clear the fractions"

multiply by LCD = 3

$(-\frac{1}{3}x + y = 5)\,3$

$\frac{3}{1}(-\frac{1}{3}x) + 3y = 3(5)$

$-x + 3y = 15$

$x - 3y = -15$

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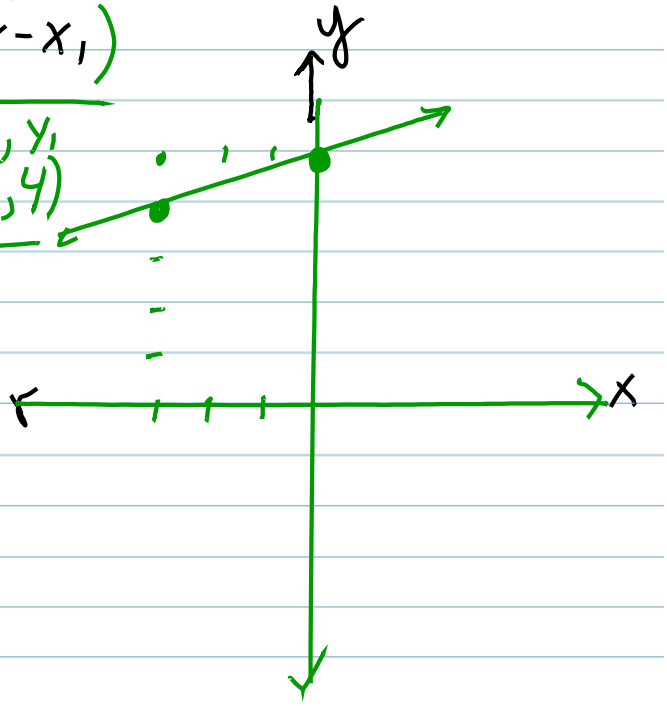

"Graph a line passing through $(-3, 4)$ having a slope of $\frac{1}{3} = m$

Express the equation in
a) slope-intercept form and
b) standard form

$$y - y_1 = m(x - x_1) \quad \text{(slope)}$$

$$y - 4 = \tfrac{1}{3}(x - (-3))$$

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

$$y - 4 = \tfrac{1}{3}x + \tfrac{1}{3}\left(\tfrac{3}{1}\right)$$

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$$\left(-\tfrac{1}{3}x + y = 5\right)3$$

$$\tfrac{3}{1}\left(-\tfrac{1}{3}x\right) + 3y = 3(5)$$

$$-x + 3y = 15$$

$$\uparrow -1 \qquad -1$$

$$x - 3y = -15$$

"Find the equation of a line passing through (-4, 0) and (0, 2)"

(x_1, y_1) (x_2, y_2)

① Use the points to find the slope

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

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{2 - 0}{0 - (-4)} = \frac{2}{4} = \frac{1}{2}$$

② Use the point-slope formula

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

$$y - 0 = \frac{1}{2}(x - (-4))$$

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

$$y = \frac{1}{2}x + \frac{1}{2} \cdot \frac{4}{1} \; 2$$

$y = \frac{1}{2}x + 2$ slope-intercept form

$-\frac{1}{2}x \quad -\frac{1}{2}x$

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

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

no leading negative → $\frac{-x}{-1} + \frac{2y}{-1} = \frac{4}{-1}$

$x - 2y = -4$