M-G Geometry Week 16 1/15

Find the line that goes between the points

$(2,3)$ and $(4,9)$

(x,y) (x,y)

1.) Find the slope

$$\text{slope} = m = \frac{\text{rise}}{\text{run}} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{9-3}{4-2} = \frac{6}{2} = 3$$

2.) Plug into $y = mx + b$

$y = mx + b$

$9 = (3)(4) + b$

$9 = 12 + b$

$-12 \quad -12$

$-3 = b$

$y = mx + b$

$y = 3x - 3$

$(8, -2)$ and $(4, 10)$ Find the equation for the line.

1.) Find slope $m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{10-(-2)}{4-8} = \frac{10+2}{-4} = \frac{12}{-4} = -3$

2.) Plug into $y = mx + b$

$y = mx + b$

$10 = (-3)(4) + b$

$10 = -12 + b$

$+12 \quad +12$

$b = 22$

$y = mx + b$

$y = -3x + 22$

Graph. - Standard Form

$3x - 6y = 12$

$Ax + By = C$

Graph by intercept

$3x - 6y = 12$

$x = 0$

$\frac{-6y}{-6} = \frac{12}{-6}$

$y = -2$

$(0, -2)$

y-int $(0, y)$

$3x - 6y = 12$

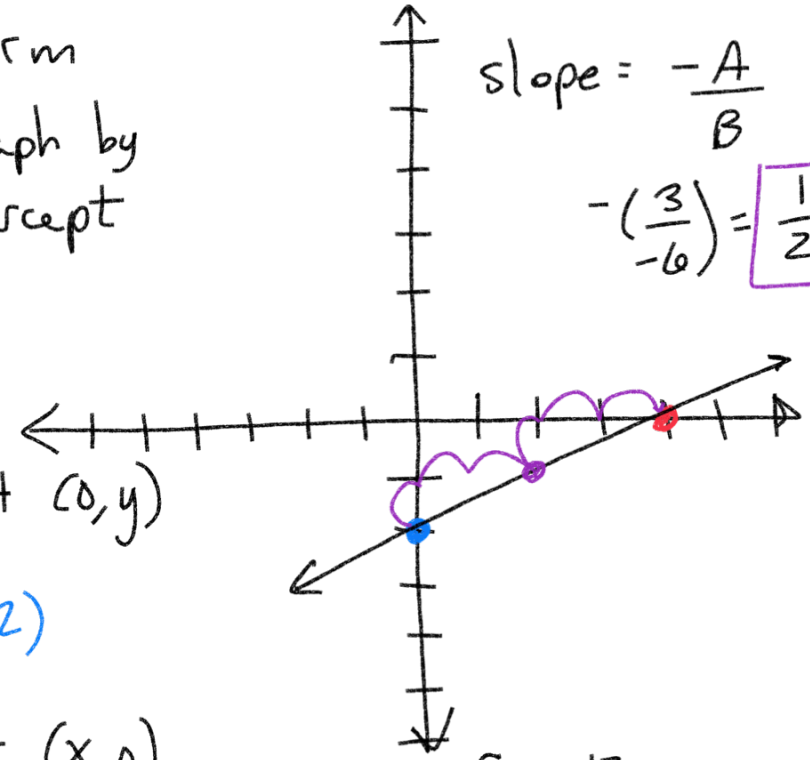
$y = 0$

$\frac{3x}{3} = \frac{12}{3}$

$x = 4$

$(4, 0)$

x-int $(x, 0)$



slope $= -\frac{A}{B}$

$-\left(\frac{3}{-6}\right) = \frac{1}{2}$

x-int $= \frac{C}{A} = \frac{12}{3} = 4$

y-int $= \frac{C}{B} = \frac{12}{-6} = -2$

Graph.

$-6x + 4y = 24$

$-6x + 4y = 24$

$x = 0$

$\frac{4y}{4} = \frac{24}{4}$

$y = 6$

$(0, 6)$

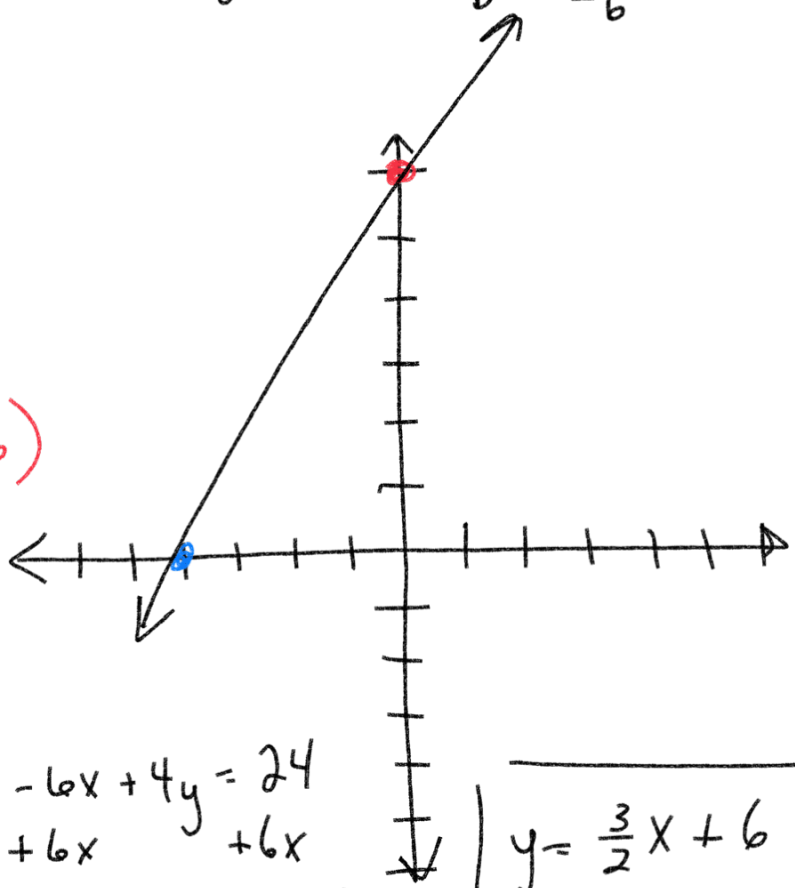
$-6x + 4y = 24$

$y = 0$

$\frac{-6x}{-6} = \frac{24}{-6}$

$x = -4$

$(-4, 0)$



$-6x + 4y = 24$

$+6x \quad +6x$

$\frac{4y}{4} = \frac{6x + 24}{4}$

$y = \frac{3}{2}x + 6$

Parallel lines → Have the same slope

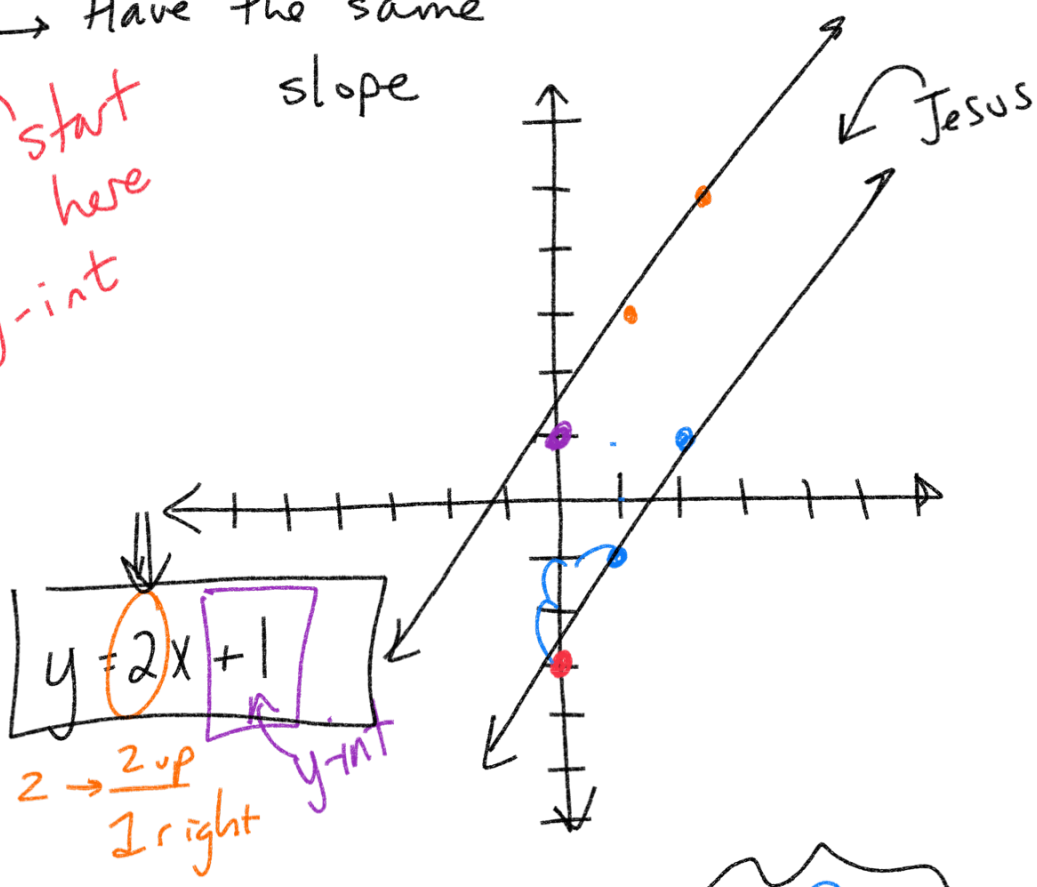
$y = 2x - 3$ (start here: y-int)

1.) Graph y-int

2.) Use slope

$\frac{2}{1} \rightarrow \frac{\text{up } 2}{1 \text{ right}}$

$\frac{\text{rise}}{\text{run}}$ ↕ ↔



Find a line parallel to the line $y = \frac{1}{4}x - 2$

that goes through $(4, 8)$

Given slope → $\frac{1}{4}$

Needed slope → $\frac{1}{4} = m$

$y = mx + b$

$y = \frac{1}{4}x + 7$

$y = mx + b$

$8 = \left(\frac{1}{4}\right)(4) + b$

$8 = 1 + b$

$-1 \quad -1$

$7 = b$

$\frac{1}{4} * \frac{4}{1} = \frac{4}{4}$

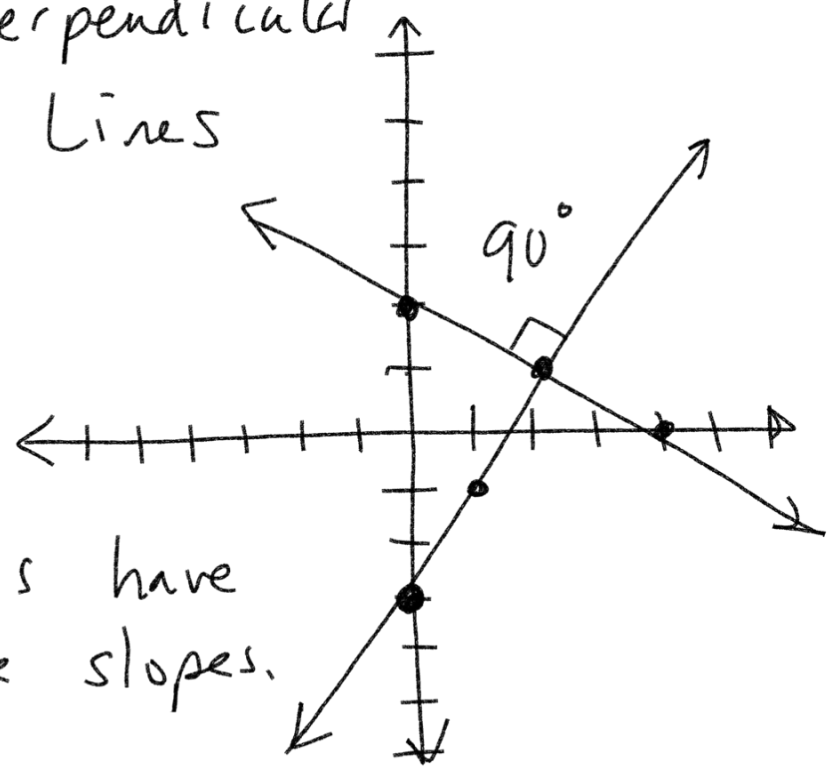
1

$y = 2x - 3$

Perpendicular Lines

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

slope $= -\frac{1}{2} = \frac{\text{down } 1}{2 \text{ right}}$



perpendicular lines have opposite inverse slopes.

$2 \rightarrow$ change sign $\rightarrow -2 \rightarrow$ Flip $\rightarrow -\frac{1}{2}$

Find the equation for a line perpendicular to $y = 3x - 2$ that goes through $(6, -9)$

Given slope: $\frac{3}{1}$

Need slope:

$3 \rightarrow$ opposite $\rightarrow \frac{-3}{1} \rightarrow$ inverse (flip) $\rightarrow -\frac{1}{3}$

$y = mx + b$

$-9 = \left(-\frac{1}{3}\right)(6) + b$

$-9 = -2 + b$

$+2 \quad +2$

$-7 = b$

$y = mx + b$

$y = -\frac{1}{3}x - 7$

$3x - 4y = 12$

$3x - 4y = 12$

$-3x \qquad -3x$

$$\frac{-4y}{-4} = \frac{-3x}{-4} + \frac{12}{-4}$$

Given: $y = \frac{3}{4}x - 3$

Perpendicular line

$y = mx + b$ (m = slope)

slope $\quad \frac{-A}{B} \quad -\left(\frac{3}{-4}\right) = \frac{3}{4}$

$\frac{3}{4}$ → opposite change sign → $-\frac{3}{4}$ → inverse flip → $\frac{-4}{3}$