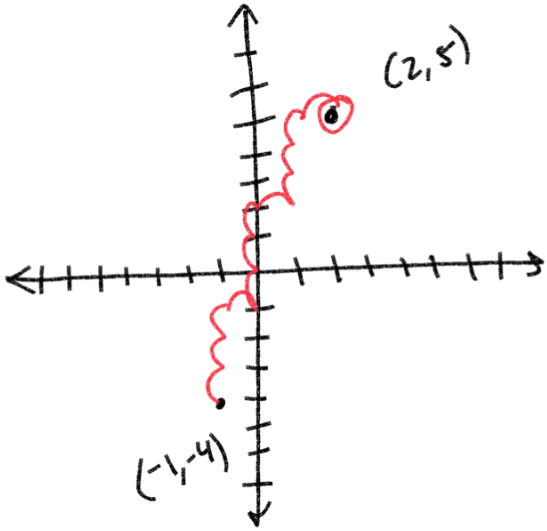
M-G Geometry Week 15 1/16

1.) Find the slope $\overset{x_2\ y_2}{(2,5)}$ $\overset{x_1\ y_1}{(-1,-4)}$



$$\text{slope} = m = \frac{\text{rise}}{\text{run}} = \frac{y_2 - y_1}{x_2 - x_1}$$

$$\frac{5-(-4)}{2-(-1)} = \frac{5+4}{2+1} = \frac{9}{3} = \boxed{3}$$

$$\frac{3}{1} = \frac{3 \text{ up}}{1 \text{ right}}$$

Slope-Intercept

$$y = mx + b$$

slope y-intercept

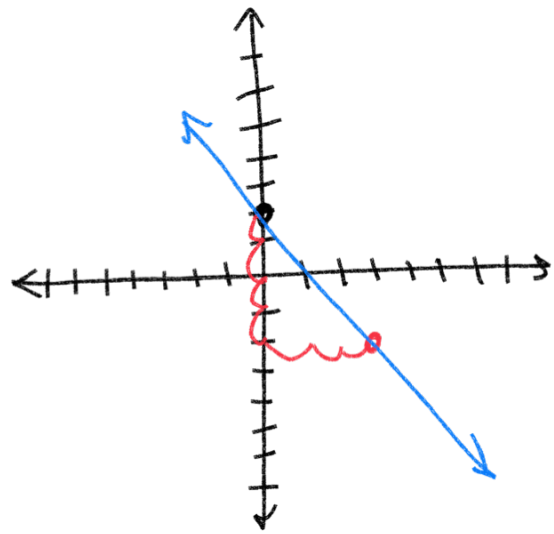
2.) Write in a linear equation

slope $= \frac{2}{3}$ y-intercept $= -5$

$$y = mx + b$$

$$\boxed{y = \frac{2}{3}x - 5}$$

Graph. $y = \frac{-4}{3}x + 2$



1.) Plot y-int

2.) Use slope

$\frac{-4}{3} \rightarrow \frac{\text{down } 4}{3 \text{ right}}$

Find the equation for a line with:

slope $= \frac{2}{3}$ through $(-3, 9)$

$x \quad y$

slope-intercept

$y = mx + b$

$9 = \left(\frac{2}{3}\right)(-3) + b$

$9 = -2 + b$

$+2 \quad +2$

$11 = b$

$y = mx + b$

$\boxed{y = \frac{2}{3}x + 11}$

point-slope

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

$y - 9 = \frac{2}{3}(x + 3)$

$y - 9 = \frac{2}{3}x + 2$

$+9 \quad +9$

$\boxed{y = \frac{2}{3}x + 11}$

Find linear equation that connects the points:

$$\begin{array}{cc} x & y \\ (1, & 8) \end{array} \text{ and } \begin{array}{cc} x & y \\ (3, & -2) \end{array}$$

1.) Find slope ✓

2.) Find y-intercept

3.) Write equation

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-2-8}{3-1} = \frac{-10}{2} = \boxed{-5}$$

$m = -5$

$y = mx + b$

$8 = -5(1) + b$

$8 = -5 + b$

$+5 \quad +5$

$13 = b$

$$\boxed{y = -5x + 13}$$

Find the linear equation that connects the points

$$\begin{array}{cc} (0, & 6) \\ x_2 & y_2 \end{array} \text{ and } \begin{array}{cc} (3, & -9) \\ x_1 & y_1 \end{array}$$

1.) Find slope

2.) Find y-intercept

3.) Write equation

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{6-(-9)}{0-3} = \frac{15}{-3} =$$

$m = -5$

$y = mx + b$

$6 = (-5)(0) + b$

$6 = 0 + b$

$6 = b$

$y = mx + b$

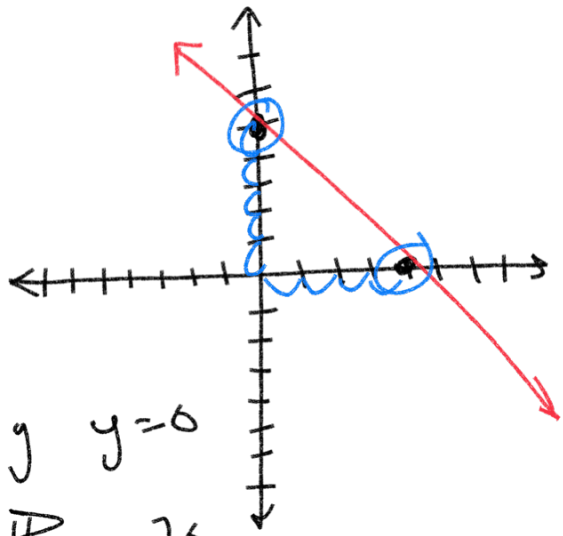
$$\boxed{y = -5x + 6}$$

Standard Form

$Ax + By = C$

$5x + 4y = 20$

Graph using the intercepts



kill x $x = 0$

$\cancel{5x} + 4y = 20$

$5(0) + 4y = 20$

$(0, 5)$ $y = 5$

kill y $y = 0$

$5x + \cancel{4y} = 20$

$x = 4$ $(4, 0)$

$5x + 4y = 20$

$-5x \qquad -5x$

$y = mx + b$

$\frac{4y}{4} = \frac{-5x}{4} + \frac{20}{4}$

$y = \frac{-5}{4}x + 5$

down 5
4 right

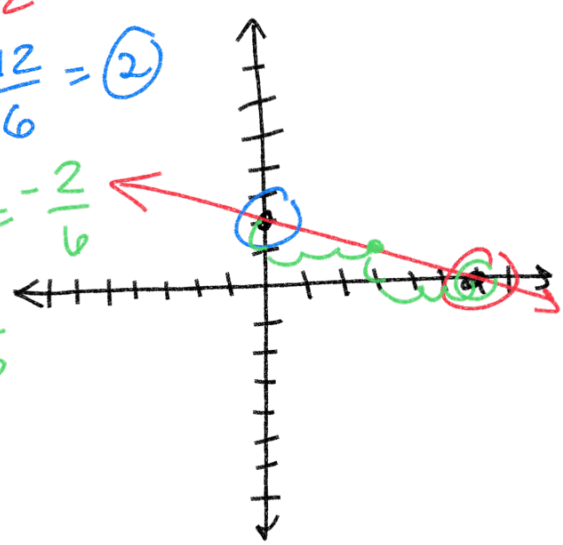
$Ax + By = C$

$2x + 6y = 12$

x-int: $\frac{C}{A} = \frac{12}{2} = 6$

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

slope: $\frac{-A}{B} = \frac{-2}{6} = -\frac{1}{3}$



$x = 0$ $y = 0$

$\cancel{2x} + \frac{6y}{6} = \frac{12}{6}$ $\frac{2x}{2} + \cancel{6y} = \frac{12}{2}$

$\boxed{y = 2}$ $x = 6$

$(0, 2)$ $(6, 0)$

Parallel Lines

Never touch

same slope

Find the equation for the line parallel to

$y = 3x + 2$ through $(4, 8)$ same slope

$m = 3$

$y = mx + b$

$8 = (3)(4) + b$

$8 = 12 + b$

$-12 \quad -12$

$-4 = b$

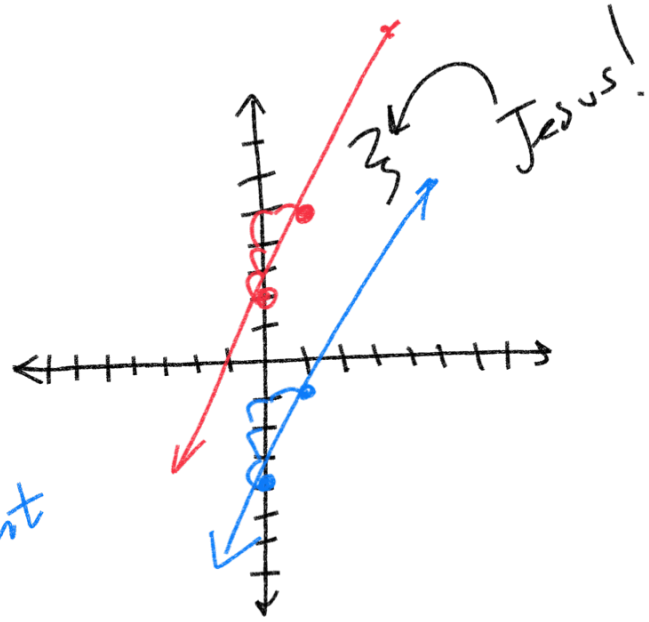
$y = mx + b$

$\boxed{y = 3x - 4}$

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

$\boxed{y = 3x - 4}$

$\frac{\text{rise}}{\text{run}}$ $\frac{\text{up } 3}{1 \text{ right}}$



Perpendicular Line intersect at 90° angle

Have slopes that are

<u>opposite</u> <u>inverses</u>

Given $y = 2x - 3$ (change sign) opposite ; (flip) inverse

slope $= 2 \longrightarrow \frac{-2}{1} \longrightarrow -\frac{1}{2}$ new slope

$$\boxed{m = -\frac{1}{2}}$$

Find perpendicular to $y = 2x - 3$ through $(2, 3)$

x y

$y = mx + b$

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

$3 = -1 + b$

$+1 \quad +1$

$b = 4$

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