

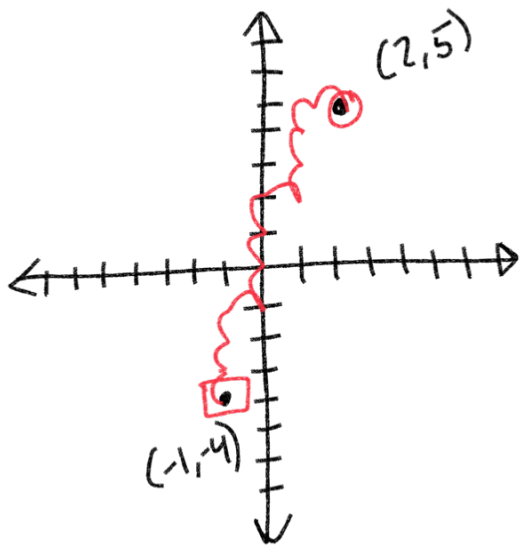
1.) Find the slope

$$\begin{array}{cc} x_1, y_1 & x_2, y_2 \\ (2, 5) & (-1, -4) \end{array}$$

$$m = \frac{\text{rise}}{\text{run}} = \frac{y_2 - y_1}{x_2 - x_1} \quad \frac{\text{up/down}}{\text{right}}$$

$$m = \frac{-4 - 5}{-1 - 2} = \frac{-9}{-3} = \boxed{3}$$

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



2.) Write in a linear equation

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

slope-intercept

$$y = mx + b$$

↓

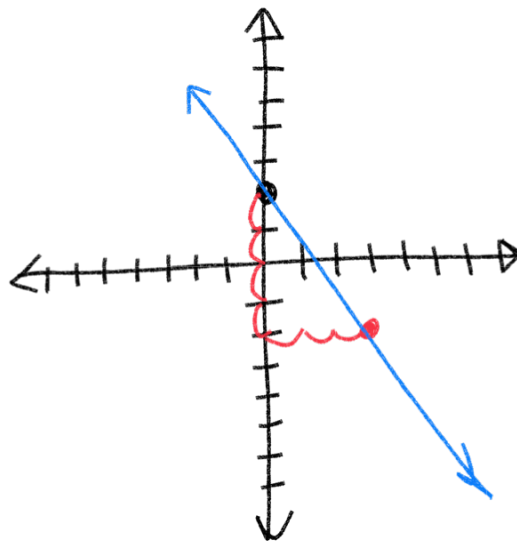
$$\boxed{y = \frac{2}{3}x - 5}$$

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

{ 1.) Plot y-int

{ 2.) Use slope

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



Find equation for a line

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

slope-intercept

{ $y = mx + b$

↓ ↓ ↓

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

$9 = -2 + b$
+2 +2

$11 = b$

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

$m = \frac{2}{3}$

$x = -3$

$y = 9$

point-slope

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

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

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

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

Find linear equation that connects the points

$(1, 8)$ and $(3, -2)$

1.) Find slope

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

2.) Find y-int

3.) Write equation

$$y = mx + b$$

$$\downarrow \quad \downarrow$$
$$8 = (-5)(1) + b$$

$$8 = -5 + b$$

$$+5 \quad +5$$

$$13 = b$$

$$y = -5x + 13$$

Standard form

$$Ax + By = C$$

$$5x + 4y = 20$$

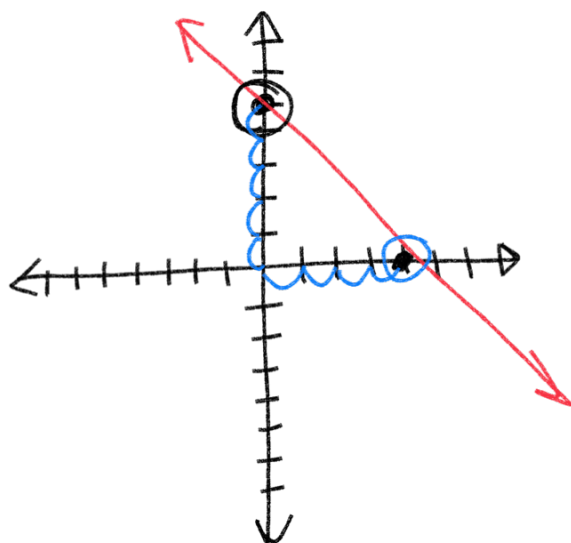
kill x $x=0$

$$\cancel{5x} + \frac{4y}{4} = \frac{20}{4} \quad (0, 5)$$
$$y = 5$$

kill y $y=0$

$$5x + \cancel{4y} = 20$$
$$x = 4 \quad (4, 0)$$

Graph using intercepts



$$5x + 4y = 20$$
$$-5x \quad -5x$$

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

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

$$Ax + By = C$$

$$A=2 \quad B=6 \quad C=12$$

$$2x + 6y = 12$$

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

$$2x + 6y = 12$$

$$-2x \quad -2x$$

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

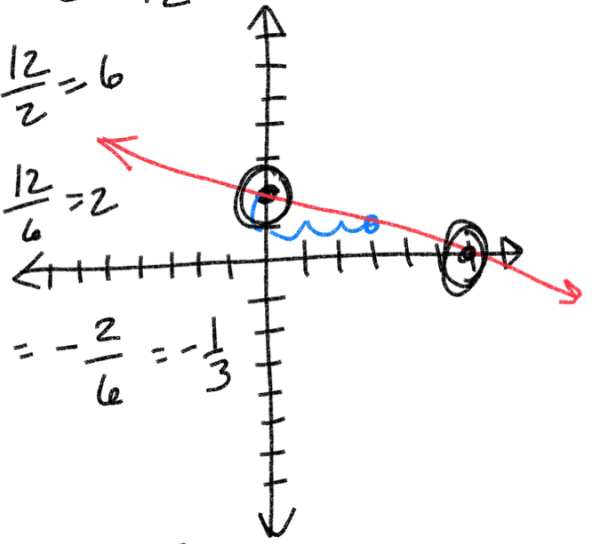
$$\frac{6y}{6} = \frac{-2x + 12}{6}$$

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

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

$$\text{slope} = -\frac{1}{3}$$

down 1
3 right



$$x=0$$

$$y = -\frac{1}{3}(0) + 2$$

$$y = 2 \quad (0, 2)$$

~~$$2x + 6y = 12$$~~

$$y = 2$$

~~$$2x + 6y = 12$$~~

$$x = 6$$

Parallel Lines

slopes are equal

because never touch

Find the equation for a line parallel to

$$y = 3x + 2$$

through point $(4, 8)$

$$y = mx + b$$

↑
slope

slope

$$3 = m$$

parallel lines have
the same slope

$$y = mx + b$$

↓ ↓ ↓

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

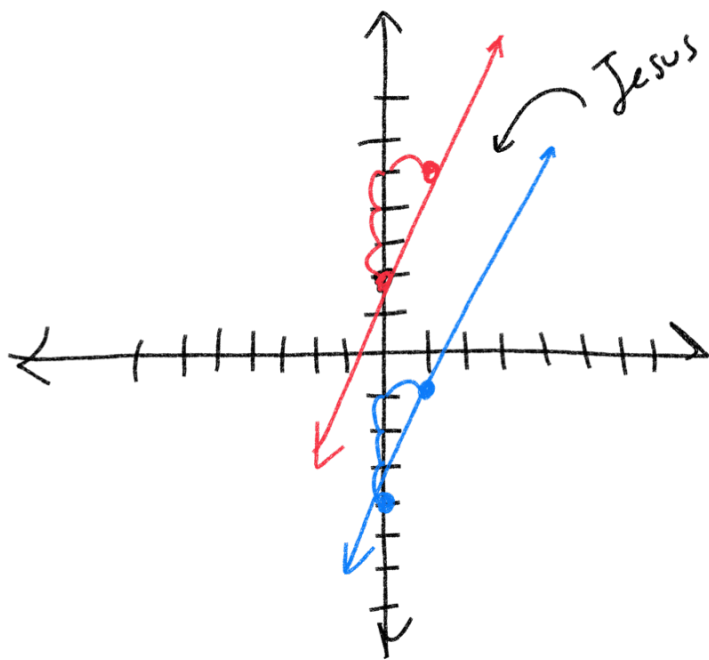
$$\{ 8 = 12 + b$$

$$-12 \quad -12$$

$$b = -4$$

$$y = mx + b$$

$$y = 3x - 4$$



$$y = 3x + 2$$

$$y = 3x - 4$$

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

Perpendicular Lines

intersect at 90° angles

Have slopes that are opposite inverses

Given $y = 2x - 3$ through point $(2, 3)$
 given slope = 2 $\xrightarrow{\text{change sign}}$ $-\frac{2}{1}$ $\xrightarrow{\text{flip}}$ $\frac{-1}{2} = m_{\text{new}}$

$$y = mx + b$$

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

$$3 = -1 + b$$

$$+1 \quad +1$$

$$4 = b$$

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

