

slope

$$\text{slope} = \frac{\text{rise}}{\text{run}} = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1}$$

(3, 2) (-5, 12)  
 $x_1, y_1$      $x_2, y_2$

$$m = \frac{12 - 2}{-5 - 3} = \frac{10 \div 2}{-8 \div 2} = \boxed{-\frac{5}{4}}$$

$$-\frac{5}{4} = \frac{\text{down } 5}{4 \text{ right}}$$

(-4, 3), (2, -9)    slope =  $\frac{\text{rise}}{\text{run}} = \frac{y_2 - y_1}{x_2 - x_1}$

$$= \frac{-9 - 3}{2 - (-4)} = \frac{-12}{2 + 4} = \frac{-12}{6} = \boxed{-2}$$

slope-intercept form

↑  
m

↑  
b

$$y = mx + b$$

$$\boxed{m = \text{slope} = \frac{3}{2}}$$

$$y\text{-int} : b = 6$$

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

$$\text{slope} = -\frac{8}{9}$$

$$y\text{-int} : -3$$

$$\boxed{y = -\frac{8}{9}x - 3}$$

$(-1, 7)$   $(3, -5)$

Find the equation for the line that goes through the following points.

1.) Find slope

$$\text{slope} = m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-5 - 7}{3 - (-1)} = \frac{-12}{3 + 1} = \frac{-12}{4} = \boxed{-3}$$

$$m = -3$$

2.) Use slope and a point to find b

$$y = mx + b$$

↓ ↓ ↓

$$7 = (-3)(-1) + b$$

$$7 = 3 + b$$

-3 -3

$$b = 4$$

$(-1, 7)$   $x = -1$

$$y = 7$$

$$m = -3$$

3.) Plug into

$$y = mx + b$$

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

$(-2, 9)$   $(6, 5)$  Find the equation.

1.) Find slope

$$\text{slope} = m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{5 - 9}{6 - (-2)} = \frac{5 - 9}{6 + 2} = \frac{-4}{8} = -\frac{1}{2}$$

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

2.) Find  $b$

$$(6, 5) \quad x = 6 \quad y = 5$$

$$y = mx + b$$

$$\begin{array}{ccc} \downarrow & \downarrow & \downarrow \\ 5 & = & (-\frac{1}{2})(6) + b \end{array} \quad b = 8$$

$$\begin{array}{r} 5 = -3 + b \\ +3 \quad +3 \end{array}$$

3.)  $y = mx + b$

$$\boxed{y = -\frac{1}{2}x + 8}$$

# Standard Form

$$Ax + By = C$$

$$2x + 3y = 6$$

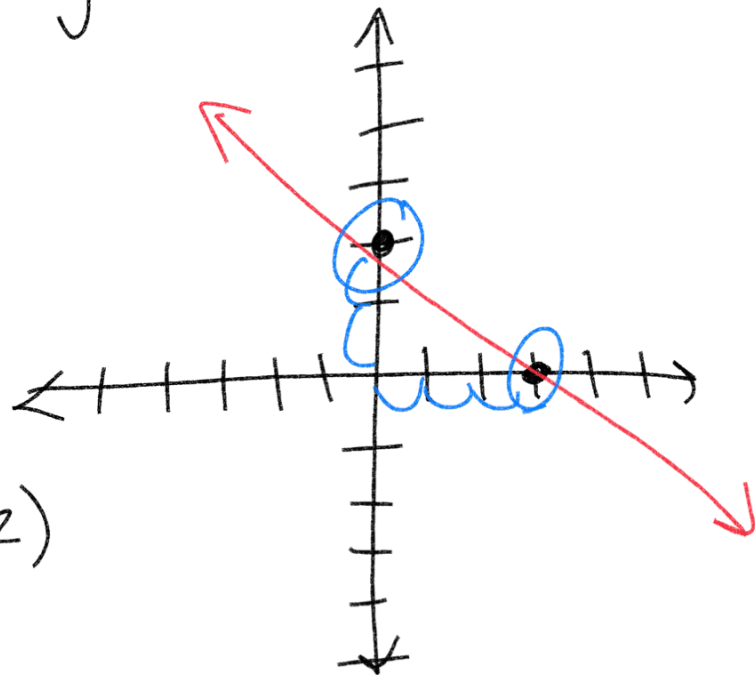
Graph the intercepts

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

$x = 0$   $(0, 2)$   
 $y = 2$

$$2x + \cancel{3y} = 6 \quad (3, 0)$$

$y = 0$   $\frac{2x}{2} = \frac{6}{2}$   
 $x = 3$



$$2x + 3y = 6$$

$-2x \quad -2x$

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

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

↑ slope  
↑ y-int

$$2x - 8y = 16$$

$$\cancel{2x} - 8y = 16$$
$$\frac{-8y}{-8} = \frac{16}{-8}$$

$$x = 0$$

$$y = -2$$

$$(0, -2)$$

$$2x - \cancel{8y} = 16$$

$$y = 0$$

$$(8, 0)$$

$$\frac{2x}{2} = \frac{16}{2}$$

$$x = 8$$

