

Name: _____

Date: _____

Learning Goal

I can graph and describe linear relations.

9.1 Solving Linear Inequalities.

There are 3 ways to represent a line for graphing

1. **Slope-intercept**

$$y = mx + b$$

↑ slope ↗ y-int.

2. **slope-point**

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

↑ slope

line passes through (x_1, y_1) 3. **Standard**

$$Ax + By = C$$

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

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

Example 1 Graph the following lines on the grid provided.

$$\begin{aligned} & \begin{array}{l} \begin{matrix} +3 & = -3 \\ +1 & \end{matrix} \quad y = 3x + 2 \\ & \begin{array}{l} \begin{matrix} \uparrow & \\ y\text{-int} & \end{matrix} \\ \begin{matrix} y & = 2 \\ y = 3(0) + 2 \\ = 0 + 2 \\ = 2 \end{matrix} \end{array} \\ & \begin{array}{l} m = \text{slope} \\ = \frac{\text{rise}}{\text{run}} \\ = \frac{\Delta y}{\Delta x} \\ = \frac{y_2 - y_1}{x_2 - x_1} \end{array} \end{array} \end{aligned}$$

$$\begin{aligned} & y = \frac{1}{3}x + 2 \\ & \begin{array}{l} \begin{matrix} \uparrow & \\ y\text{-int} & \end{matrix} \\ \begin{matrix} y & = 2 \\ m = \frac{+1}{+3} \\ = -\frac{1}{3} \end{matrix} \end{array} \end{aligned}$$

$$\begin{aligned} & y = -3x - 4 \\ & \begin{array}{l} \begin{matrix} \uparrow & \\ y\text{-int} & \end{matrix} \\ \begin{matrix} y & = -4 \\ m = \frac{-3}{+1} \\ = +\frac{3}{-1} \end{matrix} \end{array} \end{aligned}$$

$$\begin{aligned} & y = -\frac{1}{3}x - 4 \\ & \begin{array}{l} \begin{matrix} \uparrow & \\ y\text{-int} & \end{matrix} \\ \begin{matrix} y & = -4 \\ m = \frac{-1}{+3} \\ = +\frac{1}{-3} \end{matrix} \end{array} \end{aligned}$$

Example 2 Graph the following lines on the grid provided.

$$x + 4y = 8$$

$$\begin{array}{l} x\text{-int} \\ y=0 \end{array}$$

$$\begin{array}{l} y\text{-int} \\ x=0 \end{array}$$

$$\begin{array}{l} x+4(0)=8 \\ x=8 \end{array}$$

$$\begin{array}{l} 0+4y=8 \\ \frac{4y}{4}=\frac{8}{4} \\ y=2 \end{array}$$

$$4x + y = 8$$

$$\begin{array}{l} x\text{-int} \\ y=0 \end{array}$$

$$\begin{array}{l} 4x+0=8 \\ 4x=8 \\ x=2 \end{array}$$

$$2x + 6y = 18$$

$$\begin{array}{l} x\text{-int} \\ y=0 \end{array}$$

$$\begin{array}{l} 2x=18 \\ x=9 \end{array}$$

$$\begin{array}{l} y\text{-int} \\ x=0 \end{array}$$

$$\begin{array}{l} 6y=18 \\ y=3 \end{array}$$

$$3x + 4y = 24$$

$$\begin{array}{l} x\text{-int} \\ y=0 \end{array}$$

$$\begin{array}{l} 3x=24 \\ x=8 \end{array}$$

$$\begin{array}{l} y\text{-int} \\ x=0 \end{array}$$

$$\begin{array}{l} 4y=24 \\ y=6 \end{array}$$

Example

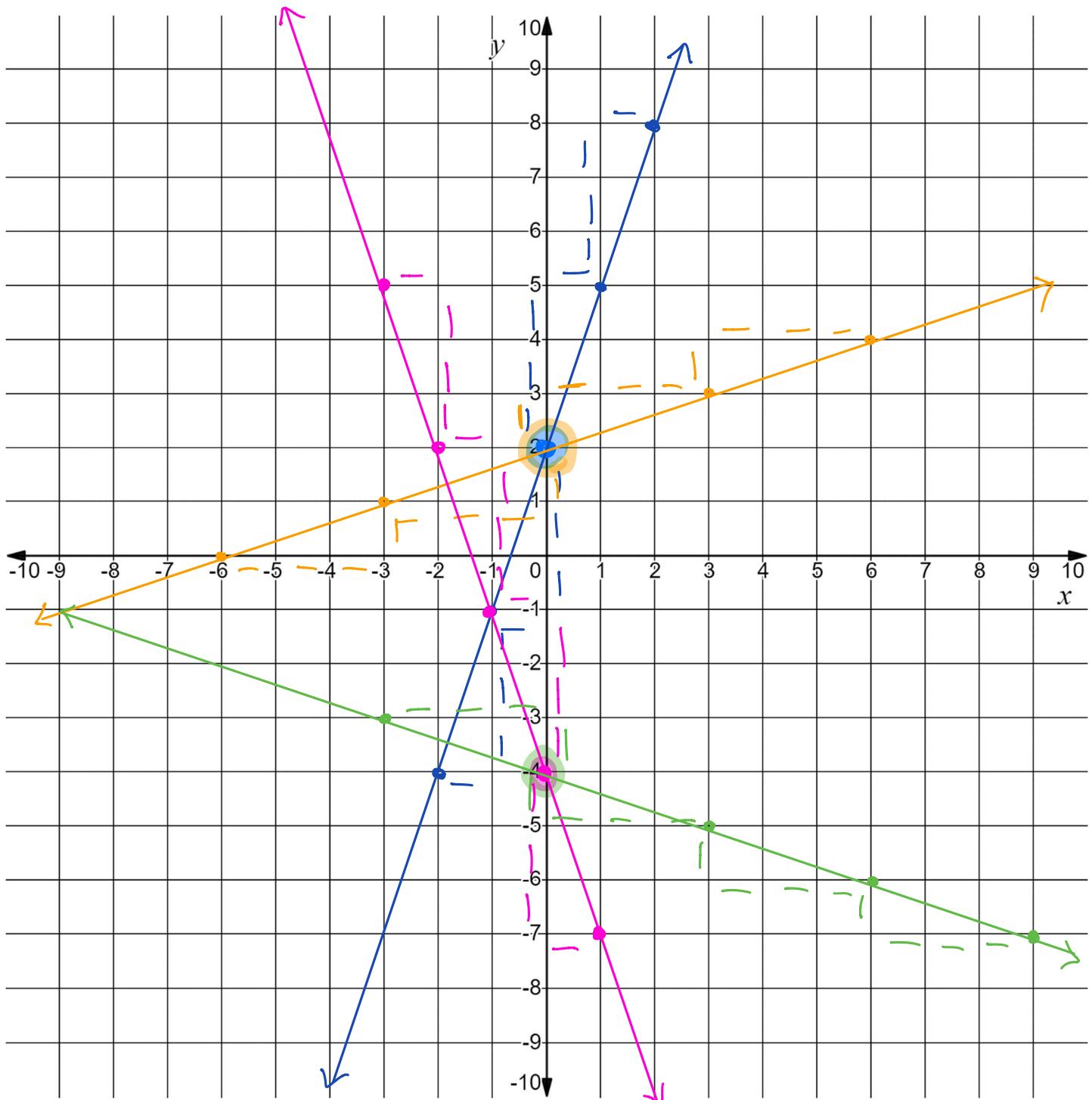
1

$y = 3x + 2$

$y = \frac{1}{3}x + 2$

$y = -3x - 4$

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

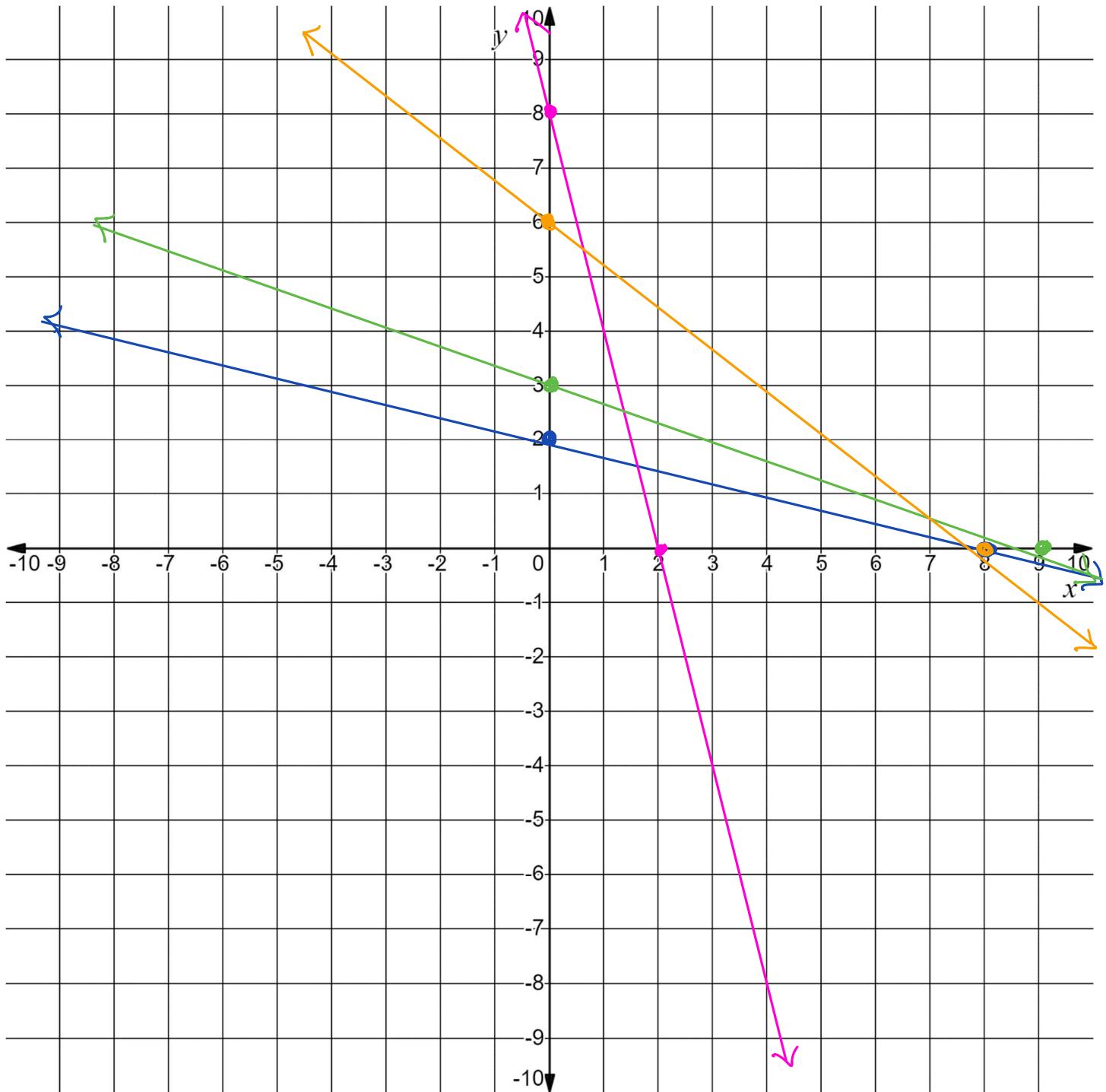


$x + 4y = 8$

$4x + y = 8$

$2x + 6y = 18$

$3x + 4y = 24$

Example 2

Example 3 Graph the following lines on the grid provided.

$$y - 2 = \frac{1}{2}(x - 6)$$

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

point (6, 2)

$$y + 2 = \frac{1}{2}(x + 6)$$

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

(-6, -2)

$$y - 2 = -2(x - 6)$$

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

(6, 2)

$$y + 2 = -2(x + 6)$$

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

(-6, -2)

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

$$(x_1, y_1)$$

Example 4 Graph the following lines on the grid provided.

$$y - 2 = 0$$

$$+2 \quad +2$$

$$y = 2$$

$$y = -2$$

$$x + 3 = 0$$

$$-3 \quad -3$$

$$x = -3$$

$$x = 3$$

$y = a \Rightarrow$ horizontal line

$x = b \Rightarrow$ vertical line

$$y - 2 = \frac{1}{2}(x - 6)$$

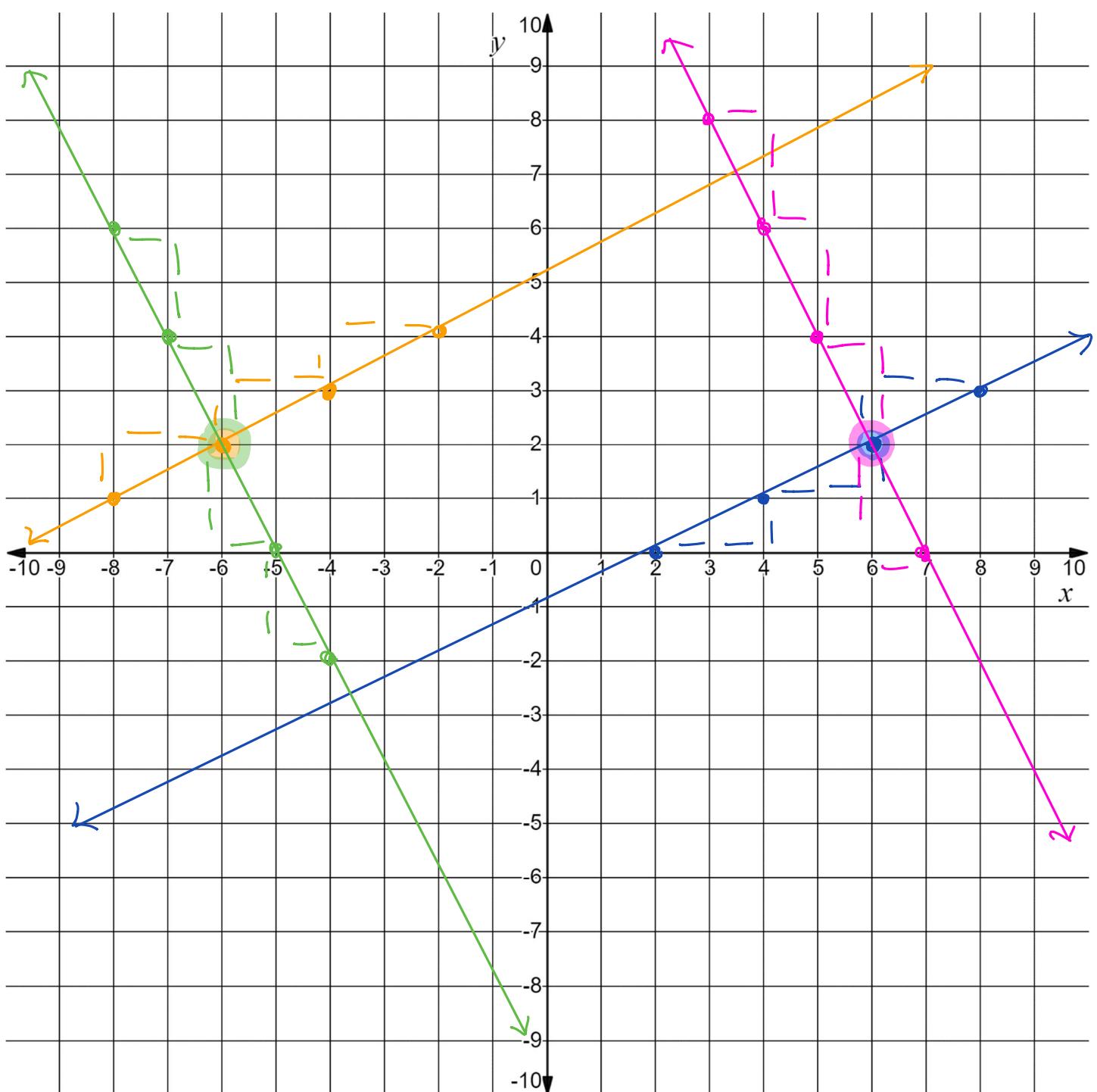
3

$$y + 2 = \frac{1}{2}(x + 6)$$

$$y - 2 = -2(x - 6)$$

$$y + 2 = -2(x + 6)$$

Example



$y - 2 = 0$

$y = -2$

$x + 3 = 0$

$x = 3$

Example _____