

# Warm-Up Problems

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

Write the equation of each line:

1. Slope is  $m = 7$ , passes through  $(4, -1)$

$$y - (-1) = 7(x - 4)$$

2. Passes through  $(3, 1)$  and  $(-2, 9)$   
 $\begin{matrix} & x & y & & x & y \\ & \circlearrowleft & & & \circlearrowleft & \end{matrix}$

$$\frac{9 - 1}{-2 - 3} = \frac{8}{-5}$$

$$y - 1 = -\frac{8}{5}(x - 3)$$

# Parallel and Perpendicular Lines

Thm. Parallel lines have the same slope.

Thm. Perpendicular lines have slopes that are *change sign* negative reciprocals. *flip*

$$\frac{2}{3} \text{ and } -\frac{3}{2}$$

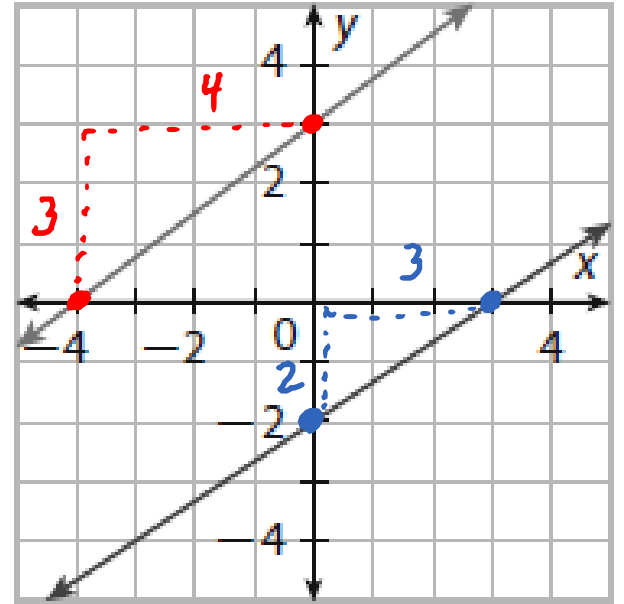
$$-5 \text{ and } \frac{1}{5}$$

Ex. Determine if the lines are parallel.

no

$$\frac{3}{4}$$

$$\frac{2}{3}$$



Ex. Write the equation of the line parallel to  $y = 5x + 1$  that passes through the point  $(-1, 2)$ .

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

$$y - 2 = 5(x - (-1))$$

→ slope = 5

Ex. Write the equation of the line parallel to  $y = -3x + 4$  that passes through the point  $(9, -6)$ .

$$y - (-6) = -3(x - 9)$$

→ slope = -3

Ex. Write the equation of the line perpendicular to  $y = 4x - 2$  that passes through the point  $(3, -1)$ .

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

$$\text{slope} = -\frac{1}{4}$$

Ex. Write the equation of the line perpendicular to  $y = -\frac{2}{5}x + 12$  that passes through the point  $(-6, -8)$ .

$$y - (-8) = \frac{5}{2}(x - (-6))$$

$$\text{slope} = \frac{5}{2}$$

Pract. Write the equation of each line:

a) Parallel to  $y = -1x$ , passes through  $(5, 2)$   
 $\rightarrow \text{slope} = -1$   $y - 2 = -1(x - 5)$

b) Parallel to  $y = \frac{3}{2}x + 4$ , passes through  $(-4, 0)$   
 $\rightarrow \text{slope} = \frac{3}{2}$   $y - 0 = \frac{3}{2}(x - (-4))$

c) Perpendicular to  $y = \frac{3}{2}x + 2$ , passes through  $(3, -1)$   
 $\rightarrow \text{slope} = -\frac{2}{3}$   $y - (-1) = -\frac{2}{3}(x - 3)$

d) Perpendicular to  $y = -4x$ , passes through  $(0, 0)$   
 $\rightarrow \text{slope} = \frac{1}{4}$   $y - 0 = \frac{1}{4}(x - 0)$