6-5b Writing Linear Equations and Point-Slope Form

No matter whether you are using the slope-intercept form of an equation or the point-slope for of the equation, you always need to slope to determine the equation of a line.

- When given just **two points**, your first step is to find the slope of the line containing those two points and then use *point-slope form.*

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

EX: Find the equation of the line that passes through the points (-3, -2) and (1, 6)

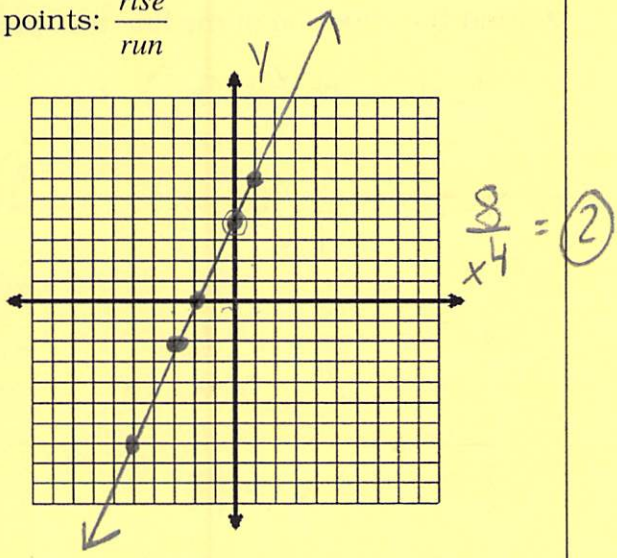
STEP 1:
Remember to find the slope given two points we like to use one of the following two methods.

1. Use the Formula: $\frac{y_2 - y_1}{x_2 - x_1}$

x_1 y_1 x_2 y_2
$(-3, -2)$ $(1, 6)$

$$\frac{6 - -2}{1 - -3} = \frac{8}{4} = 2$$

2. Plot the points: $\frac{rise}{run}$



STEP 2:
Plug the slope and **one** of the two points into the *point-slope* form to find the equation of the line.

Slope 2 and use (-3, -2)

$y - y_1 = m(x - x_1)$
$y - -2 = 2(x - -3)$
$y + 2 = 2(x + 3)$
$y + 2 = 2x + 6$
$-2 \quad -2$
$y = 2x + 4$

Slope 2 and use (1, 6)

$y - 6 = 2(x - 1)$
$y - 6 = 2x - 2$
$+6 \quad +6$
$y = 2x + 4$

You try:

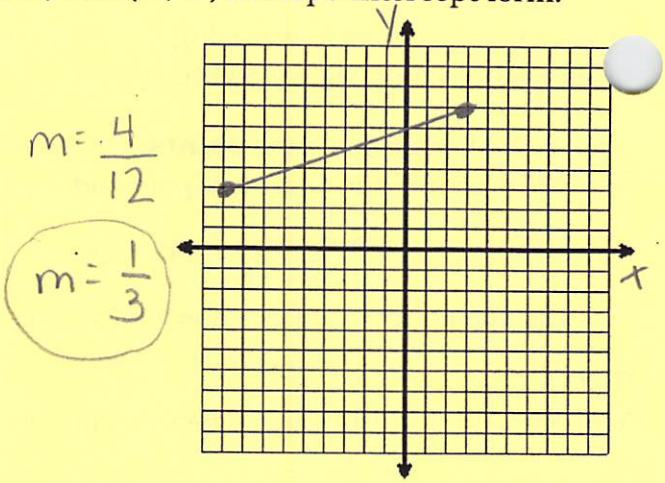
1. Find the equation of the line that passes through (-9, 3) and (3, 7) in slope-intercept form.

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

$y - 7 = \frac{1}{3}(x - 3)$

$y - 7 = \frac{1}{3}x - 1$

$y = \frac{1}{3}x + 6$



2. Find the equation of the line that passes through (-8, 7) and (4, -2) in slope-intercept form.

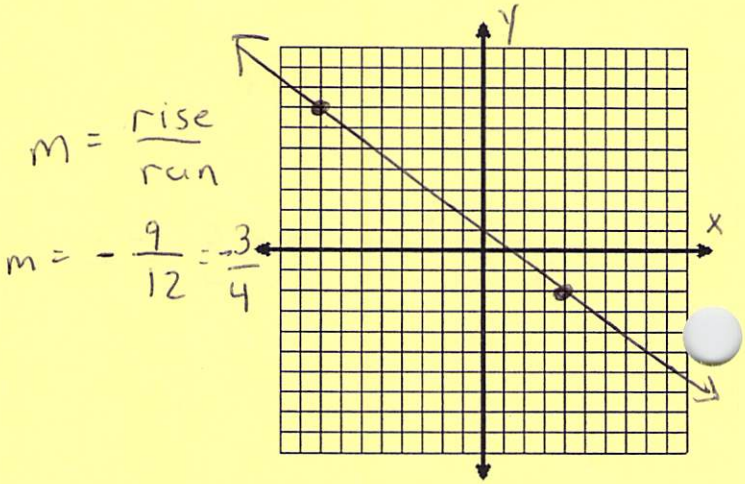
$y - y_1 = m(x - x_1)$

$y - 7 = -\frac{3}{4}(x + 8)$

$y - 7 = -\frac{3}{4}x - 6$

$+7 \qquad +7$

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



3. Find the equation of the line that passes through (-3, 5) and (-3, 9)

$x = -3$

4. Find the equation of the line that passes through (1, 5) and (-7, 5)

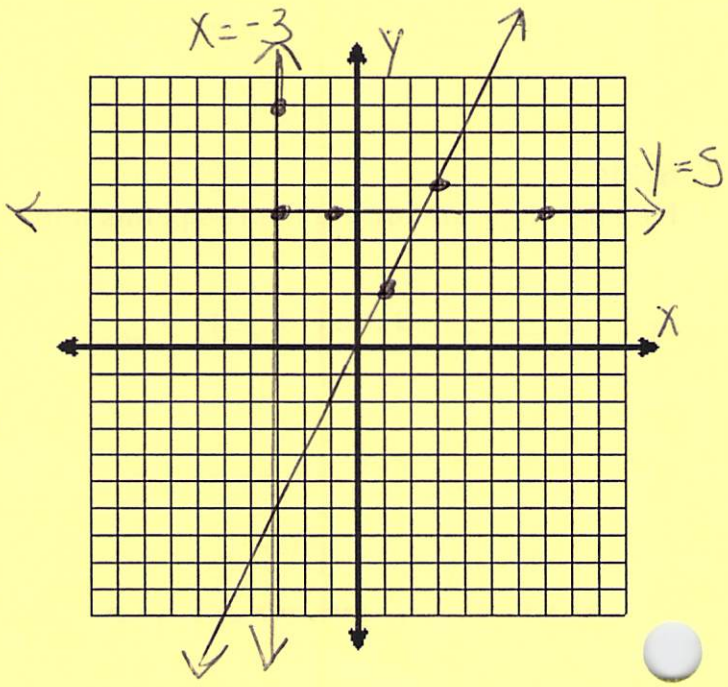
$y = 5$

5. Find the equation of the line that passes through (3, 6) and (2 , 1)

$m = \frac{4}{2} = 2$

$y = 2x + 0$

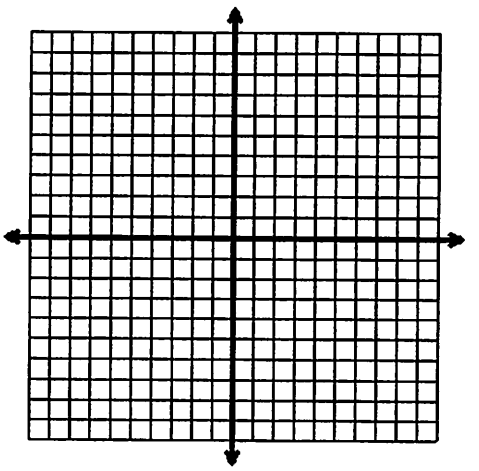
$y = 2x$



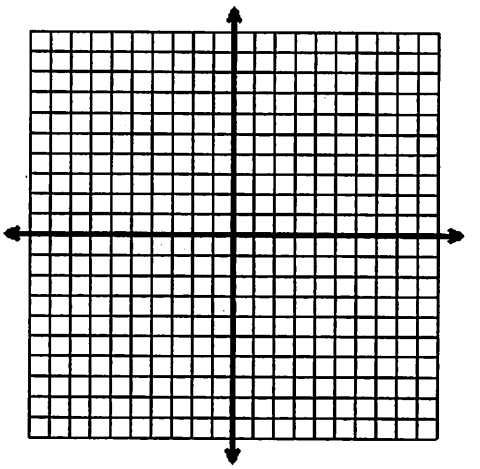
Practice 6-5b

Name _____

1. Find the equation of the line that passes through (5, 4) and (-5, 0) in slope-intercept form.



2. Find the equation of the line that passes through (1, 3) and (8, 5) in point-slope form.



3. Determine if the point (12, -15) is on the line that passes through (2, 0) and (0, 3)

Hint: Find the equation of the line that passes through (2, 0) and (0, 3) in slope-intercept form.