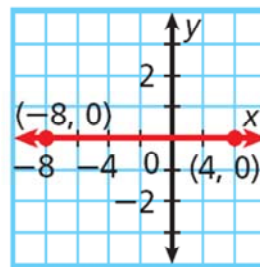
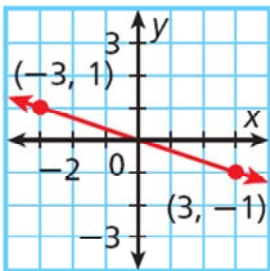


Warm-up 9-25

1. Find the slope of the lines below.

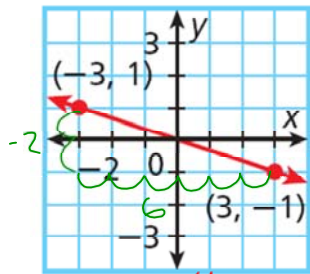


2. A climber is on a hike. After 2 hours he is at an altitude of 400 feet. After 6 hours, he is at an altitude of 700 feet.

What is the average rate of change?

Warm-up 9-26

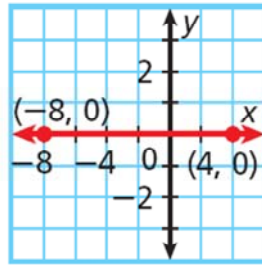
1. Find the slope of the lines below.



$$-\frac{2}{6} = \left(-\frac{1}{3}\right)$$

$$m = \frac{-1 - 1}{3 - (-3)} = \frac{-2}{6}$$

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



zero

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

2. A climber is on a hike. After 2 hours he is at an altitude of 400 feet. After 6 hours, he is at an altitude of 700 feet.

What is the average rate of change?

75 ft/hr

x	y
2	400
6	700

4 < 6 300 >

$$\frac{300}{4} = 75$$

$$\frac{700 - 400}{6 - 2} = \frac{300}{4} = 75$$

I notice...

I wonder...

Name: _____

$$\frac{(7)-(5)}{(2)-(1)} = \frac{2}{1} = 2$$

same slope

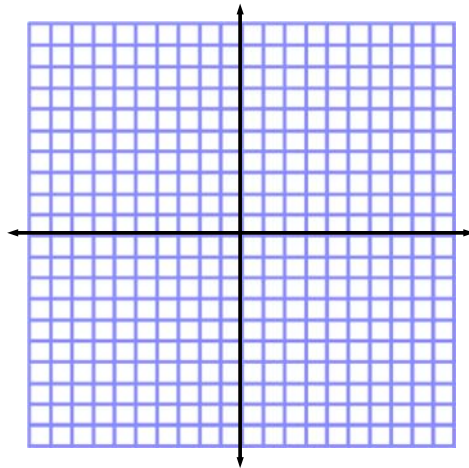
$$(1, 5); (2, 7)$$

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

$$y = 2x + 3$$

$$y = mx + b$$

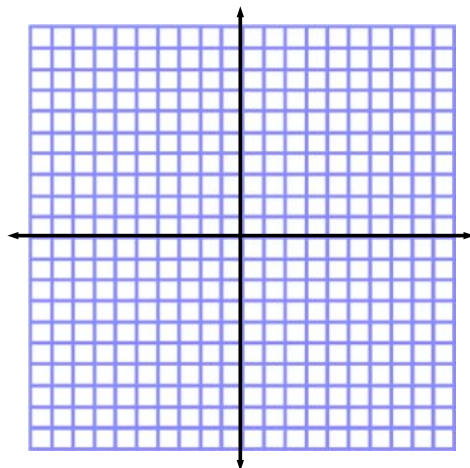
$$\begin{array}{r} \frac{2}{1} \\ y - 5 = 2x - 2 \\ +5 \quad +5 \\ \hline y = 2x + 3 \end{array}$$



$$(2, -3); (4, 3)$$

$$(y + 3) = 3(x - 2)$$

$$y = 3x - 9$$



Today's Goals

I can...

- write a linear equation in point-slope form
- write a linear equation in slope intercept form

Section 3.6 ~ Slope Intercept Form

$$y = mx + b$$

slope

y-intercept

A line has a slope of -2 and a y - intercept of (0, -3). Write the linear equation for this line.

$$y = -2x + -3$$

$$y = -2x - 3$$

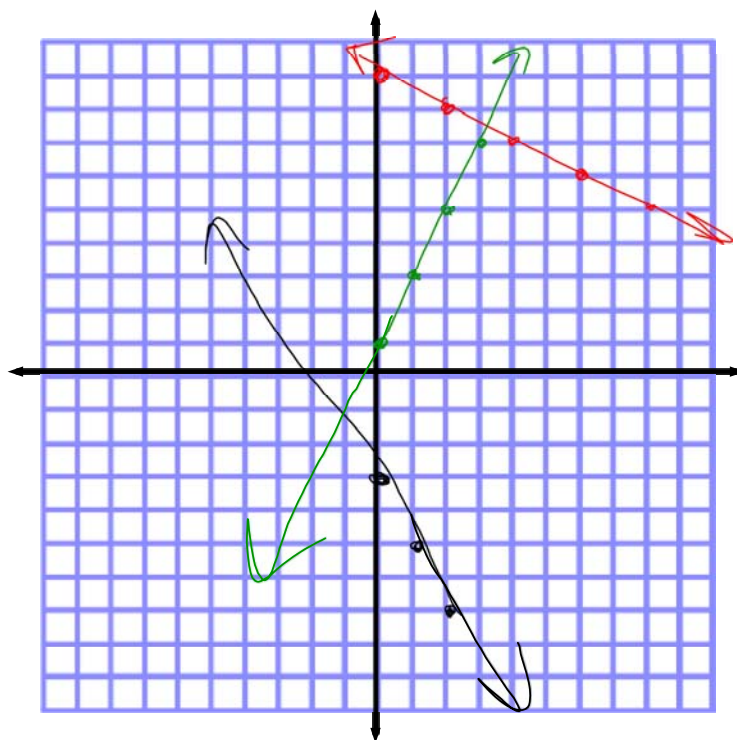
$$-2 = \frac{-2}{1}$$

$$y = -\frac{1}{2}x + 9$$

y-int + 9
 $m = -\frac{1}{2}$

$$y = 2x + 1$$

y-int: 1
 $m = 2 = \frac{2}{1}$

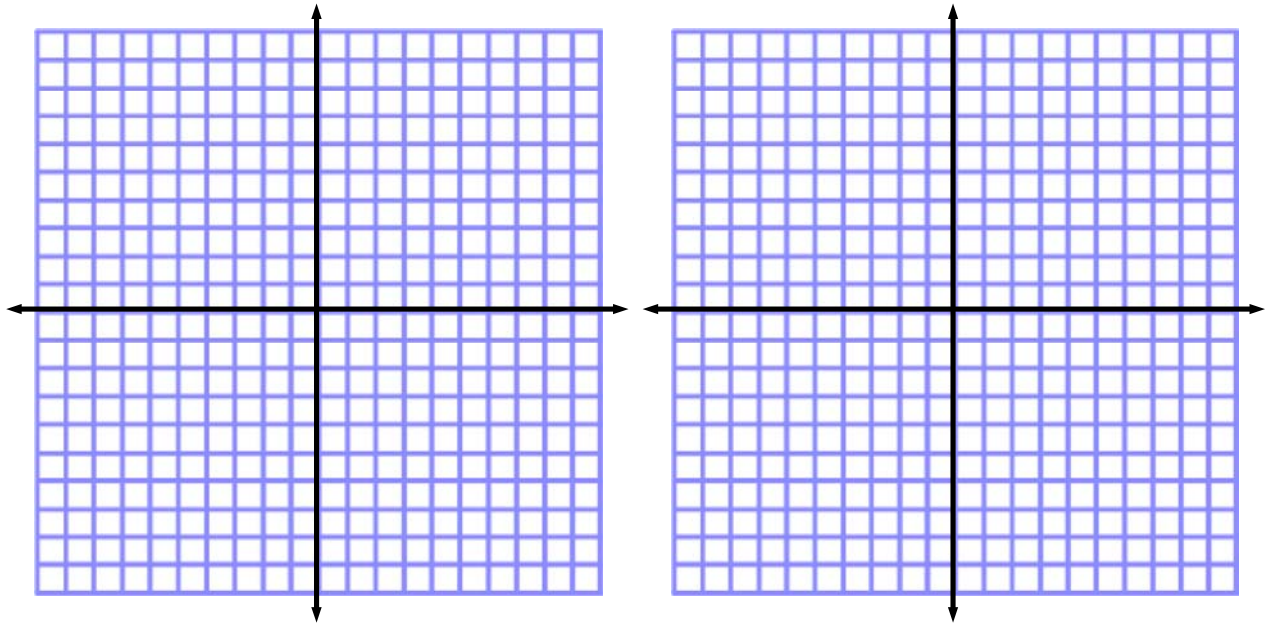


Using Slope intercept form

1. Find the y- intercept and slope for the following lines and graph the line.

a.) $y = 5x - 2$

b.) $y = -1/5x + 3$



2. Write the linear equation for the following lines

a.) slope: $-1/3$ y-intercept: $(0, -6)$

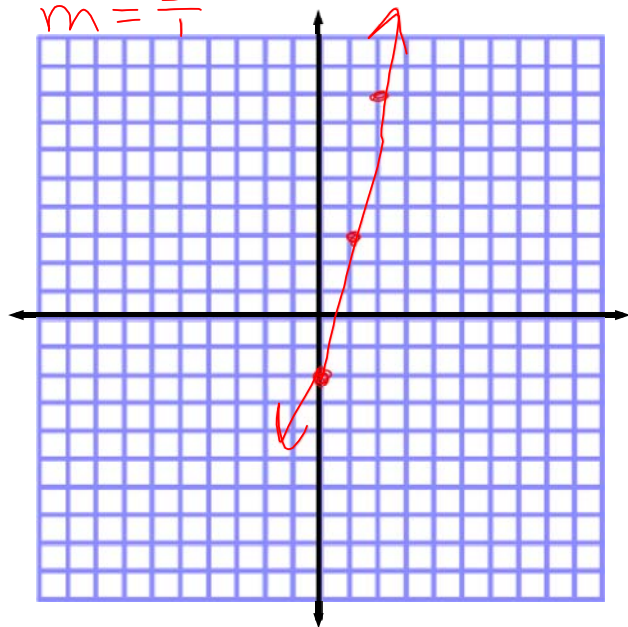
b.) slope= $5/17$ y-intercept: $(0, 16)$

Using Slope intercept form

1. Find the y- intercept and slope for the following lines and graph the line.

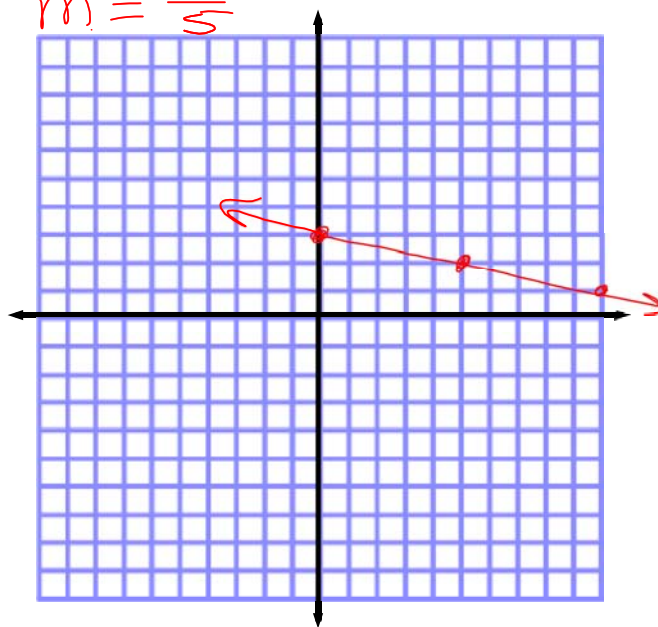
a.) $y = 5x - 2$

$m = \frac{5}{1}$



b.) $y = -\frac{1}{5}x + 3$

$m = -\frac{1}{5}$



2. Write the linear equation for the following lines

a.) slope: $-\frac{1}{3}$ y-intercept: $(0, -6)$

b.) slope = $\frac{5}{17}$ y-intercept: $(0, 16)$

Try These!!

$$y = mx + b$$

Write the equation for each line in slope intercept form.

1. slope = $\frac{1}{4}$ and y-intercept = 4

2. slope = -9 and y-intercept = $-\frac{5}{4}$

Try These!!

Write the equation for each line in slope intercept form.

1. slope = $\frac{1}{4}$ and y-intercept = 4 $y = mx + b$

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

2. slope = -9 and y-intercept = $-\frac{5}{4}$ $y = mx + b$

$y = -9x + -\frac{5}{4}$

$y = -9x - \frac{5}{4}$

How to use slope-intercept form to write a linear equation.

Write an equation in slope-intercept form for the line that contains the pair of points.

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

x_1, y_1 x_2, y_2
 $(2, 7)$ and $(5, 22)$

$$\frac{(22) - (7)}{(5) - (2)} = \frac{15}{3} = 5$$

$$m = 5$$

$$y = 5x + b$$

$$7 = 5(2) + b$$

$$7 = 10 + b$$

$$\begin{array}{r} -10 \quad -10 \\ \hline -3 = b \end{array}$$

$$y = 5x - 3$$

$(6, 22)$ and $(2, 14)$

$$\frac{(14) - (22)}{(2) - (6)} = \frac{-8}{-4} = 2$$

$$y = 2x + b$$

$$14 = 2(2) + b$$

$$14 = 4 + b$$

$$\begin{array}{r} -4 \quad -4 \\ \hline 10 = b \end{array}$$

$$y = 2x + 10$$

Step #1: Find the slope

Step #2: Pick one ordered pair and circle it

Step #3: Plug in the slope you found, the x - value from the ordered pair, and the y-value from the ordered pair into slope intercept form

Step #4: Solve for b

Step #5: Plug in **ONLY** the slope value and the b value into the slope intercept form ($y = mx + b$)

How to use slope-intercept form to write a linear equation.

Write an equation in slope-intercept form for the line that contains the pair of points. $m = \frac{y_2 - y_1}{x_2 - x_1}$ $y = mx + b$

x_1, y_1 x_2, y_2
(2, 7) and (5, 22)

$$m = \frac{22 - 7}{5 - 2} = \frac{15}{3} = 5$$

① $y - y_1 = m(x - x_1)$

$$\begin{array}{r} y - 7 = 5(x - 2) \\ +7 \quad 5x - 10 \quad +7 \\ \hline \end{array}$$

$y = 5x - 3$

② $y = 5x + b$

$$\begin{array}{r} 7 = 5(2) + b \\ 7 = 10 + b \\ -10 \quad -10 \\ \hline \end{array} \quad b = -3$$

(6, 22) and (2, 14)

x_1, y_1 x_2, y_2

$$m = \frac{14 - 22}{2 - 6} = \frac{-8}{-4} = 2$$

① $y - y_1 = m(x - x_1)$

$$\begin{array}{r} y - 22 = 2(x - 6) \\ +22 \quad 2x - 12 \quad +22 \\ \hline \end{array}$$

$y = 2x + 10$

Step #1: Find the slope

Step #2: Pick one ordered pair and circle it

Step #3: Plug in the slope you found, the x - value from the ordered pair, and the y-value from the ordered pair into slope intercept form

Step #4: Solve for b

Step #5: Plug in **ONLY** the slope value and the b value into the slope intercept form ($y = mx + b$)

$y = 5x - 3$

$m = \frac{y_2 - y_1}{x_2 - x_1}$ $y = mx + b$ $y - y_1 = m(x - x_1)$

② $y = 2x + b$

$$22 = 2(6) + b$$

$$22 = 12 + b$$

$$\begin{array}{r} -12 \quad -12 \\ \hline \end{array}$$

$10 = b$

$y = 2x + 10$

Section 4.7: Point-Slope Form

* In order to use this form you must have 1 point on the line and the slope of the line

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

Write an equation for a line that passes through the point $(-1, -5)$ slope of 6.

$$y - (-5) = 6(x - (-1))$$

Step 1: Write point-slope form

$$y + 5 = 6(x + 1)$$

Step 2: Substitute

Step 3: Look for a double negative change to +

Step 4: Simplify and solve for y (to write in slope-intercept form)

What about when given 2 points? $y - y_1 = m(x - x_1)$

Write an equation given a slope of -2 and point (-2, 3).

$$y - (3) = -2(x - (-2))$$

$$y - 3 = -2(x + 2)$$

Write the equation for a line going through the points (2, -3) and (4, 1) and with a slope of 2.

Write an equation for the line that goes through $\begin{matrix} x_1 & y_1 \\ (1, -4) \end{matrix}$ and $\begin{matrix} x_2 & y_2 \\ (3, 2) \end{matrix}$

$$\frac{(2) - (-4)}{3 - 1} = \frac{2 + 4}{3 - 1} = \frac{6}{2} = 3$$

$$y - (-4) = 3(x - (1))$$

$$y + 4 = 3(x - 1)$$

$$\begin{array}{r} y + 4 = 3x - 3 \\ \underline{-4 \quad -4} \\ y = 3x - 7 \end{array}$$

$$y - 2 = 3(x - 3)$$

$$\begin{array}{r} y - 2 = 3x - 9 \\ \underline{+2 \quad +2} \end{array}$$

$$y = 3x - 7$$

$$y = 3x + b$$

$$2 = (3)(3) + b$$

$$2 = 9 + b$$

$$\underline{-9 \quad -9}$$

$$-7 = b$$

$$y = 3x - 7$$

Write the equation of the line in **point-slope form** formed by the points $(-1, 4)$ and $(1, 6)$

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

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

$$y = mx + b$$

Write the equation of the line in **point-slope form** formed by the points $(-1, 4)$ and $(1, 6)$

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$m = \frac{6 - 4}{1 - (-1)} = \frac{2}{2} = 1$$

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

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

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

$$y = x + 5$$

What about when given 2 points?

$$m = \frac{y_2 - y_1}{x_2 - x_1} \quad y = mx + b \quad y - y_1 = m(x - x_1)$$

Write the equation for a line going through the points (2, -3) and (4, 1)

Write an equation for the line that goes through (1, -4) and (3, 2)

What about when given 2 points?

$$y = mx + b$$

Write the equation for a line going through the points $(2, -3)$ and $(4, 1)$

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$m = \frac{1 - (-3)}{4 - 2} = \frac{4}{2} = 2$$

$$y = 2x - 7$$

$$\begin{aligned} y &= 2x + b \\ -3 &= 2(2) + b \\ -3 &= 4 + b \\ \underline{-4 \quad -4} \\ -7 &= b \end{aligned}$$

$$\begin{aligned} y - (-3) &= 2(x - 2) \\ y + 3 &= 2(x - 2) \\ \underline{-3 \quad 2x - 4 \quad -3} \\ y &= 2x - 7 \end{aligned}$$

Write an equation for the line that goes through $(1, -4)$ and $(3, 2)$

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$m = \frac{2 - (-4)}{3 - 1} = \frac{6}{2} = 3$$

$$y = 3x - 7$$

$$\begin{aligned} y &= 3x + b \\ -4 &= 3(1) + b \\ -4 &= 3 + b \\ \underline{-3 \quad -3} \\ -7 &= b \end{aligned}$$

$$\begin{aligned} y - (-4) &= 3(x - 1) \\ y + 4 &= 3(x - 1) \\ \underline{-4 \quad 3x - 3 \quad -4} \\ y &= 3x - 7 \end{aligned}$$

6. A climber is on a hike. After 2 hours he is at an altitude of 400 feet. After 6 hours, he is at an altitude of 700 feet. What is the average rate of change?

	35
	40

6. A climber is on a hike. After x_1 2 hours he is at an altitude of y_1 400 feet. After x_2 6 hours, he is at an altitude of y_2 700 feet. What is the average rate of change? 75 ft/hr

$$\begin{aligned}
 y - 400 &= 75(x - 2) \\
 y - 400 &= 75x - 150 \\
 y + 400 &= 75x - 150 + 400 \\
 y &= 75x + 250
 \end{aligned}$$

Homework

Workbook

pg. 34 #1-4, 6, 8, 10, 12

pg. 38 #1-4, 6, 8-10