

Warm Up

9/29

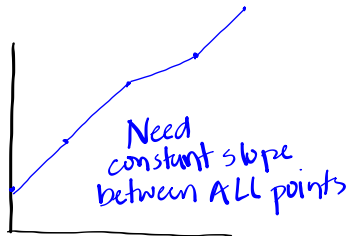
If the x values in a data table increase by different amounts, how can we decide if the relationship is linear or not?

	x	y		
+3 <	4	20	> -6	$\frac{\Delta y}{\Delta x} = \frac{-6}{3} = -2$
+4 <	7	14	> -8	$\frac{\Delta y}{\Delta x} = \frac{-8}{4} = -2$
+6 <	11	6	> -12	$\frac{\Delta y}{\Delta x} = \frac{-12}{6} = -2$

If linear, write the equation!

constant slope between all points

LINEAR



we know it's linear so this is the form of the equation

$$y = mx + b$$

$$\text{slope} = -2$$

$$y = -2x + b$$

use (4, 20)
x y

$$20 = -2(4) + b$$

$$20 = -8 + b$$

$$+8 \quad +8$$

$$\hline 28 = b$$

$$y = -2x + 28$$

Is this correct for all points?

$$y = -2x + 28$$

$$(7, 14) \quad 14 = -2(7) + 28$$

$$14 = -14 + 28$$

$$14 = 14 \quad \checkmark$$

Writing Equations of Lines

All we need are:

- slope
- y-intercept

If we are given two points, (5, 1) and (8, 10)

1. Find the slope between the points:

$$+3 \left\langle \begin{matrix} 5, 1 \\ 8, 10 \end{matrix} \right\rangle +9 \quad \frac{\Delta y}{\Delta x} = \frac{9}{3} = 3 \quad \text{OR} \quad \frac{\Delta y}{\Delta x} = \frac{10-1}{8-5} = \frac{9}{3} = 3$$

$$\frac{\Delta y}{\Delta x} = \frac{3}{1} = 3$$

2. Substitute the slope into the Slope-Intercept equation:

$$y = \underline{3}x + b$$

3. We now need to find the value of "b". We know how to solve for a variable, but what makes this difficult is that we have 3 variables at the moment.

Fortunately we have 2 solutions for this equation and they are the two points on the line! Let's substitute in a point (x, y) and then solve for "b".

Let's try both!

Substitute (5, 1) in for x and y:

$$\begin{array}{r} (1) = 3(5) + b \\ 1 = 15 + b \\ \underline{-15 \quad -15} \\ -14 = b \end{array}$$

Substitute (8, 10) in for x and y:

$$\begin{array}{r} (10) = 3(8) + b \\ 10 = 24 + b \\ \underline{-24 \quad -24} \\ -14 = b \end{array}$$

$$b = \underline{-14}$$

It doesn't matter which point you use!

4. Use your slope and y-intercept to write the equation.

$$y = 3x - 14$$

Homework Questions?

Name

Key

Block

Date

Writing Equations of Lines Practice

Write the slope-intercept form of the equation of the line through the given point with the given slope.

1) through: $(3, 2)$, slope $= -1$

$$y = mx + b$$

$$y = -1x + b$$

$$2 = -1(3) + b$$

$$2 = -3 + b$$

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

$$y = -x + 5$$

3) through: $(-5, 4)$, slope $= -\frac{8}{5}$

$$y = mx + b$$

$$y = -\frac{8}{5}x + b$$

$$4 = -\frac{8}{5}\left(\frac{-5}{1}\right) + b$$

$$4 = 8 + b$$

$$\begin{array}{r} -8 \quad -8 \\ \hline -4 = b \end{array}$$

$$y = -\frac{8}{5}x - 4$$

2) through: $(-1, 0)$, slope $= 2$

$$y = mx + b$$

$$y = 2x + b$$

$$0 = 2(-1) + b$$

$$0 = -2 + b$$

$$\begin{array}{r} +2 \quad +2 \\ \hline 2 = b \end{array}$$

$$y = 2x + 2$$

4) through: $(3, -1)$, slope $= -2$

$$y = mx + b$$

$$y = -2x + b$$

$$-1 = -2(3) + b$$

$$-1 = -6 + b$$

$$\begin{array}{r} +6 \quad +6 \\ \hline 5 = b \end{array}$$

$$y = -2x + 5$$

Write the slope-intercept form of the equation of the line through the given points.

5) through: $(-2, 5)$ and $(-1, -4)$

$$\begin{aligned} +4 \quad & \begin{matrix} -2, 5 \\ -1, -4 \end{matrix} \rightarrow -9 \quad \frac{\Delta y}{\Delta x} = \frac{-9}{1} = -9 \\ & y = -9x + b \\ & -4 = -9(-1) + b \\ & -4 = 9 + b \\ & \begin{array}{r} -9 \quad -9 \\ \hline -13 = b \end{array} \end{aligned}$$

$$y = -9x - 13$$

6) through: $(0, -5)$ and $(-3, -4)$

$$\begin{aligned} -3 \quad & \begin{matrix} 0, -5 \\ -3, -4 \end{matrix} \rightarrow +1 \quad \frac{\Delta y}{\Delta x} = \frac{-1}{3} \end{aligned}$$

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

7) through: $(3, -5)$ and $(4, 3)$

$$\begin{aligned} +1 \quad & \begin{matrix} 3, -5 \\ 4, 3 \end{matrix} \rightarrow +8 \quad \frac{\Delta y}{\Delta x} = \frac{8}{1} = 8 \end{aligned}$$

$$\begin{aligned} & y = 8x + b \\ & 3 = 8(4) + b \\ & 3 = 32 + b \\ & \begin{array}{r} -32 \quad -32 \\ \hline -29 = b \end{array} \end{aligned}$$

$$y = 8x - 29$$

8) through: $(2, -4)$ and $(-5, 3)$

$$\begin{aligned} -7 \quad & \begin{matrix} 2, -4 \\ -5, 3 \end{matrix} \rightarrow -7 \quad \frac{\Delta y}{\Delta x} = \frac{-7}{-7} = 1 \end{aligned}$$

$$\begin{aligned} & y = -1x + b \\ & -4 = -1(2) + b \\ & -4 = -2 + b \\ & \begin{array}{r} +2 \quad +2 \\ \hline -2 = b \end{array} \end{aligned}$$

$$y = -x - 2$$

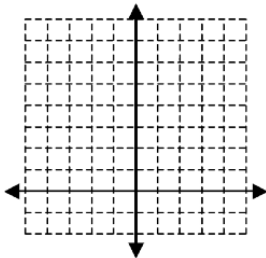
Classwork #s 1-12

Name _____ Period ____ Date _____

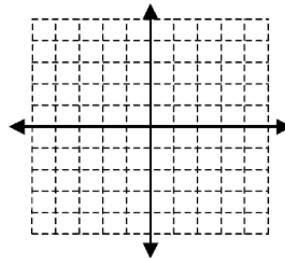
Writing Equations of Lines Practice

Graph the line that passes through the points. Then write the equation of the line in slope-intercept form.

1. $(1, 8)$ and $(-2, -1)$



2. $(-4, -1)$ and $(2, 2)$



Use the slope formula to find the slope of the line between the given points.

3. $(-4, 1)$ and $(2, -5)$

4. $(2, -3)$ and $(-3, 7)$

Write the equation in slope-intercept form for the line with the given slope that contains the given point.

5. slope = 1; $(-2, 3)$

6. slope = -3; $(-1, 6)$

Write the equation of the line in slope-intercept form that passes through the given points.

7. $(0, -5)$ and $(3, 4)$

8. $(2, 4)$ and $(1, -2)$

9. $(2, -2)$ and $(-4, 1)$

10. $(4, 3)$ and $(-8, 0)$

11. (9, -2) and (-3, 2)

12. (-3, -3) and (7, 2)

13. (1, 2) and (7, 2)

14. (5, -6) and (5, -3)

Is the relationship shown by the data linear? If it is, model the data with an equation.

15.

x	y
2	3
3	7
4	11
5	15

16.

x	y
-3	4
-1	6
1	7
3	10

17.

x	y
-2	5
3	-5
7	-13
11	-21

18.

x	y
2	3
5	18
8	33
14	63

19.

x	y
-2	25
0	19
3	10
7	-2

20.

x	y
2	3
3	10
4	17
10	24

Homework

Finish classwork