

Do Now Reminders: **Slope Formula:**  $m = \frac{y_2 - y_1}{x_2 - x_1}$

Ex 1: Find the slope (-1, 6) and (-3, 4)  $m = \frac{4 - (6)}{-3 - (-1)} = \frac{-2}{-2} = \frac{1}{1}$

Ex 2: Find the slope (-3, 2) and (7, 5)  $m = \frac{5 - (2)}{7 - (-3)} = \frac{3}{10}$

**SLOPE-INTERCEPT FORM**  $y = mx + b$

m is the

Slope

b is the

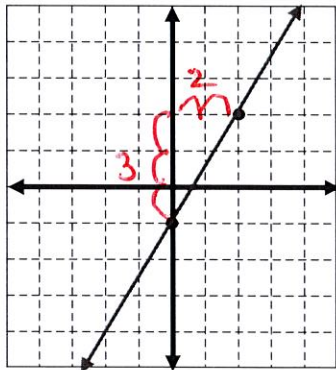
y-intercept

Write the equation of a line in slope intercept form given a graph.

A. First find the slope

B. Then see where the graph crosses the (vertical or up/down) y-axis.

3. Equation:  $y = \frac{3}{2}x - 1$



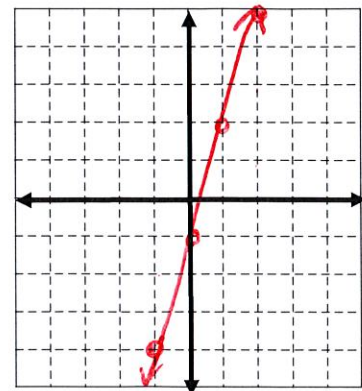
4. Show graph of  $y = -2x + 3$



We can also graph using a table of values.

5.  $y = 3x - 1$

x	$y = 3x - 1$	(x, y)
2	$y = 3(2) - 1$	5
1	$y = 3(1) - 1$	2
0	$y = 3(0) - 1$	-1
-1	$y = 3(-1) - 1$	-4



What is the slope of the equation?  $\frac{3}{1}$

What is the y - intercept? -1

Write the equation of a line in slope intercept form **given a table**.

A. **1st find the slope** Use the slope formula  $m = \frac{\text{change in } y}{\text{change in } x}$

x	y
-1	-1
0	1
1	3
2	5

*Handwritten notes: Red arrows pointing left from each row to the one below, labeled '1 <'. Red arrows pointing right from each row to the one below, labeled '> +2'.*

Slope (m) =  $\frac{2}{1}$

x	y
-2	-7
0	-1
2	5
4	11

*Handwritten notes: Red arrows pointing left from each row to the one below, labeled '+2 <'. Red arrows pointing right from each row to the one below, labeled '> +6'.*

Slope =  $\frac{6}{2} = \frac{3}{1}$

B. **2nd find the y - intercept** The y-intercept is when x = 0

y - intercept (b) = 1

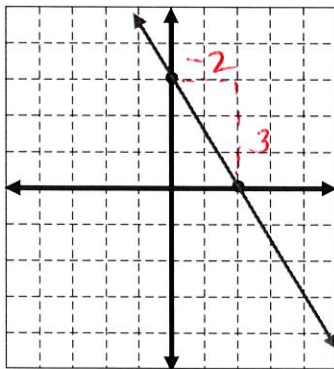
Equation y =  $2x + 1$

y - intercept (b) = -1

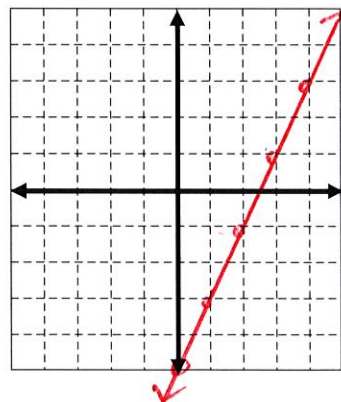
Equation y =  $3x - 1$

**Classwork:**

1. Equation: y =  $-\frac{3}{2}x + 3$



2. Graph of y = 2x - 5



3.

x	y
0	-1
1	-4
2	-7
3	-10

*Handwritten notes: Red arrows pointing left from each row to the one below, labeled '+1 <'. Red arrows pointing right from each row to the one below, labeled '> -3'.*

x	y
-4	6
-2	3
0	0
2	-3

*Handwritten notes: Red arrows pointing left from each row to the one below, labeled '+2 <'. Red arrows pointing right from each row to the one below, labeled '> -3'.*

\*

x	y
-5	-2
-8	2
-11	3
-14	5

*Handwritten notes: Red arrows pointing left from each row to the one below, labeled '-3 <'. Red arrows pointing right from each row to the one below, labeled '> +4'.*

Equation y =  $-3x - 1$

Equation y =  $-\frac{3}{2}x + 0$

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

$-2 = -\frac{4}{3}(-5) + b$

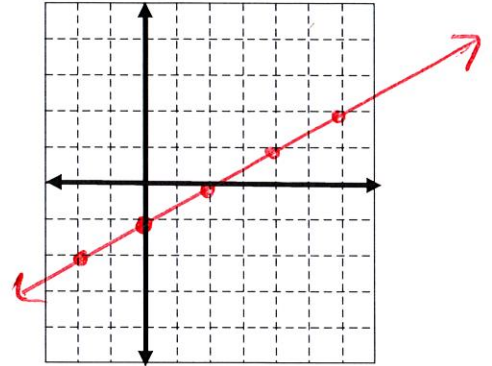
$b = -\frac{26}{3}$

$y = -\frac{4}{3}x - \frac{26}{3}$

Do Now: Write the equation of the line given in the table and graph it.

x	y
-2	-2
0	-1
2	0
4	1

Equation:  $y = \frac{1}{2}x - 1$



### What should we do if 0 is not in the table?

x	y
1	11
2	15
3	19
4	23

#### Use the substitution method

1. Find the **slope**  $m = \frac{4}{1}$
2. Fill in the  $m$  (slope) into  $y = mx + b$   $y = 4x + b$
3. Choose an ordered pair, then substitute in the  $x$  and  $y$ ...  
Now you have to solve for  $b$  ( $y$  - intercept), so get  $b$  alone.

$m = \frac{4}{1}$

$b = 7$

Equation  $y = 4x + 7$

x	y
1	8
2	5
3	2
4	-1

#### Write a linear equation for the following table.

1. Find the **slope**  $m = -3$
2. Choose an ordered pair, then substitute in the  $x$  and  $y$ ...  
Now you have to solve for  $b$  ( $y$  - intercept), so get  $b$  alone.
3. Find the  $b = 11$
4. Plug in  $m$  and  $b$  into  $y = mx + b$   $y = -3x + 11$

$m = -3$

$b = 11$

Equation  $y = -3x + 11$

**Classwork:**

**Write a linear equation for the tables shown.**

1.

x	y
0	-1
1	-4
2	-7
3	-10

*H <*  
*H <*  
*H <*

*> -3*  
*> -3*  
*> -3*

x	y
-4	6
-2	3
0	0
2	-3

*+2 <*  
*+2 <*  
*+2 <*

*> -3*  
*> -3*  
*> -3*

x	y
-5	-2
-8	2
-11	3
-14	5

*-3 <*  
*-3 <*  
*-5 <*

*> +4*  
*> +4*  
*> +4*

*CALC*

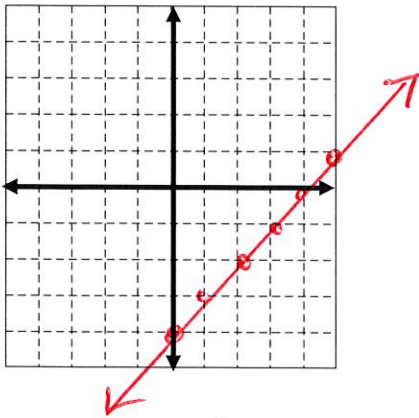
Equation  $y = -3x - 1$     Equation  $y = -\frac{3}{2}x + 0$     Equation  $y = -\frac{4}{3}x + b$

*-2 = -4/3(-5) + b*  
*20/3 + 20/3 = b*  
*40/3 = b*  
*y = -4/3x - 26/3*

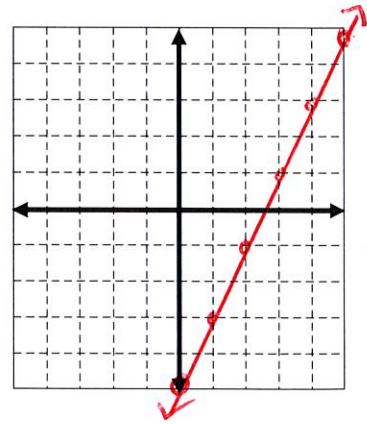
Graph the following equations using  $y = mx + b$ .

<https://www.desmos.com/testing/northcarolina/graphing>

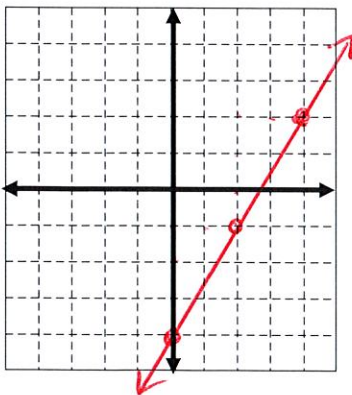
2. Graph of  $y = x - 4$



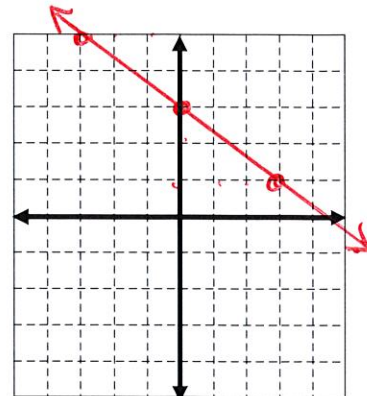
3. Graph of  $y = 2x - 5$



4. Graph of  $y = \frac{3}{2}x - 4$



5. Graph of  $y = -\frac{2}{3}x + 3$



Thursday:

1. Slope is 2 and goes through (4, -3) we know  $y = 2x + b$

$$\begin{array}{ll} x = 4 \text{ and } y = -3 & \text{Plug in.} \\ -3 = 2(4) + b & \text{Solve for b.} \\ -11 = b & \end{array}$$

Equation:  $y = 2x - 11$

Write a linear equation given a set of points.

*1st find the slope* Use the slope formula  $m = \frac{y_2 - y_1}{x_2 - x_1}$   
*2nd plug in either point to find the y-intercept.*

2. (0, -4) and (2, 6)  $m = \frac{6 - (-4)}{2 - (0)} = \frac{10}{2} = \frac{5}{1}$

$$y = 5x + b$$

Since we know the y-intercept occurs when  $x = 0$ ,  $b = -4$

Equation:  $y = 5x - 4$

*What do we do if the y - intercept is not one of the points.*

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

$$y = -2x + b \quad \text{Use the first point, } x = 1 \text{ and } y = -4$$

$$\text{So we plug in our } x \text{ and } y \quad -4 = -2(1) + b$$

Add 2 to both sides to get b by itself. Solve for b.  $b = -2$

Equation:  $y = -2x - 2$

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

$$y = \frac{1}{2}x + b \quad \text{In the first point } x = 2 \text{ and } y = 2$$

So we plug in our x and y

$$2 = \frac{1}{2}(2) + b$$

Subtract 1 to both sides to get b by itself. Solve for b.  $b = 1$

Equation:  $y = \frac{1}{2}x + 1$

5. Demarcus has a player's card for the arcade at Dave & Busters. His player's card keeps track of the number of credits he earns as he wins games. Each winning game earns the same number of credits.

Let's write an equation describing this situation.

Number of Games Won	Number of Credits
12	216
18	264
25	320
40	440

A. Let's find the slope.

What is our x variable? # of games won

What is our y variable? # of credits

$$m = \frac{264 - (216)}{18 - (12)} = \frac{48}{6} = \frac{8}{1}$$

$\frac{48}{6} = \frac{56}{7} = \frac{120}{15} = \frac{8}{1}$

B. Let's plug in a point. We can use  $x = 18$  and  $y = 264$ .  $264 = 8(18) + b$

Subtract 144 from both sides.  $b = 120$ .

**Equation:  $y = 8x + 120$**

$600 = 8x + 120$

**How many games does he need to win to reach 600 credits?** 60

Classwork: **Show Your Work!**

1. Write the equation of the line given the slope -3 and goes through (-2, 4).

$$y = -3x + b$$

$$4 = -3(-2) + b$$

$$-6 \quad -2 = b$$

$y = -3x - 2$

Write the equation of the line that passes through the given points.

2. (5, 4) and (6, 3)

$$\frac{3-4}{6-5} = \frac{-1}{1} \quad m = -1$$

$$4 = -5 + b$$

$$+5 \quad +5$$

$$9 = b$$

$y = -1x + 9$

3. (6, 1) and (7, -4)

$$\frac{-4 - (1)}{7 - (6)} = \frac{-5}{1} \quad m = -5$$

$$1 = -5(6) + b$$

$$+30 \quad +30$$

$$31 = b$$

$y = -5x + 31$

4. (4, -2) and (8, -3)

$$\frac{-3 - (-2)}{8 - (4)} = \frac{-1}{4} \quad m = -\frac{1}{4}$$

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

$$-2 = -1 + b \quad b = -1$$

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

5.

Number of Tickets	Cost (dollars)
8	12
16	18
32	30

$$y = \frac{3}{4}x + b$$

$$12 = \frac{3}{4}(8) + b$$

$$12 = 6 + b \quad b = 6$$

$y = \frac{3}{4}x + 6$

$$m = \frac{6}{8} = \frac{3}{4}$$