Algebra RH

Essential Question: How are linear functions graphed?

Do Now:

Recall that a function is an input-output relationship that has exactly one output for each input. Consider the following function rule:

The output is equal to one more than two times the input.

Using the variable y to represent the output values and using the variable x to represent the input values, write the function rule algebraically.

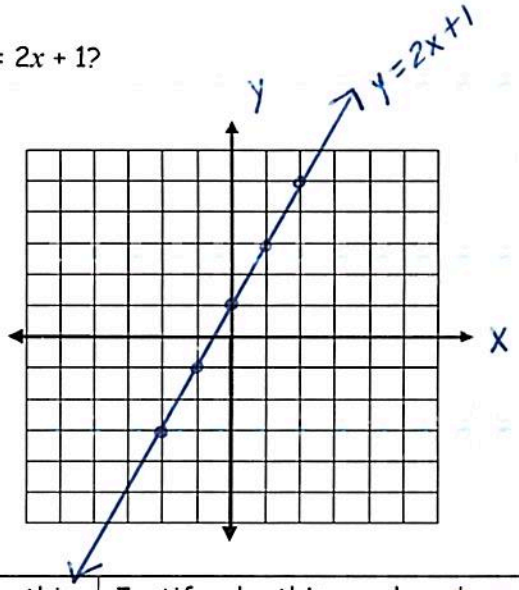
Function Rule: $y = 2x + 1$

Graphing Linear Functions

- A **linear function** is a function whose graph is a straight line.
- Linear functions can be graphed by setting up a table of inputs and outputs, known as a ***table of values.***

How do we represent all the solutions to $y = 2x + 1$?

x	2x+1	y	(x,y)
-2	2(-2)+1	-3	(-2,-3)
-1	2(-1)+1	-1	(-1,-1)
0	2(0)+1	1	(0,1)
1	2(1)+1	3	(1,3)
2	2(2)+1	5	(2,5)



Domain: all real numbers $(-\infty, \infty)$

Range: all real numbers $(-\infty, \infty)$

Choose one solution from the graph and justify why it is a solution.	Is (-25, -49) a solution to this equation?	Justify why this graph and table shows a function.
ex. (0,1) $y = 2x + 1$ $1 = 2(0) + 1$ $1 = 1$ ✓	$y = 2x + 1$ $-49 = 2(-25) + 1$ $-49 = -50 + 1$ $-49 = -49$ This is a solution because it makes the equation true.	graph passes the vertical line test (a vertical line drawn will only hit the graph in one place) the table shows each input has exactly one output

Graphing Linear Equations using the Table of Values Method

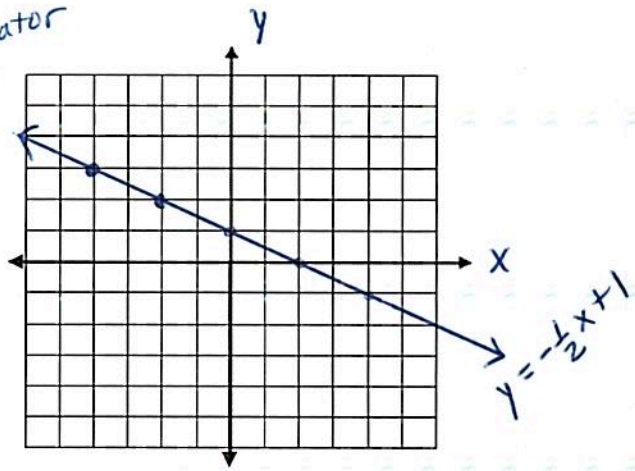
- If necessary, rewrite the equation in $y = mx + b$ form (*solve for y*).

ex. $6x + 3y = 9$
$3y = -6x + 9$
$y = -2x + 3$

- Create a table of x and y values
  - If the coefficient of x is an integer, use x values -2, -1, 0, 1, 2.
  - If the coefficient of x is a fraction, use multiples of the denominator for your x values.
- Plot the points in the table and draw an extended line.
- Label the line with the original equation.

1) Graph the solutions to $y = -\frac{1}{2}x + 1$ ← need multiples of the denominator for integer y values

x	$-\frac{1}{2}x + 1$	y	(x,y)
-4	$-\frac{1}{2}(-4) + 1$	3	(-4,3)
-2	$-\frac{1}{2}(-2) + 1$	2	(-2,2)
0	$-\frac{1}{2}(0) + 1$	1	(0,1)
2	$-\frac{1}{2}(2) + 1$	0	(2,0)
4	$-\frac{1}{2}(4) + 1$	-1	(4,-1)



x y

Is the ordered pair (585, -291.5) part of the graph of $y = -\frac{1}{2}x + 1$?

$-291.5 = -\frac{1}{2}(585) + 1$

$-291.5 = -292.5 + 1$

$-291.5 = -291.5$

yes, the point is a part of the graph

Is the order pair (426, -214) part of the graph of $y = -\frac{1}{2}x + 1$?

$-214 = -\frac{1}{2}(426) + 1$

$-214 = -213 + 1$

$-214 \neq -212$

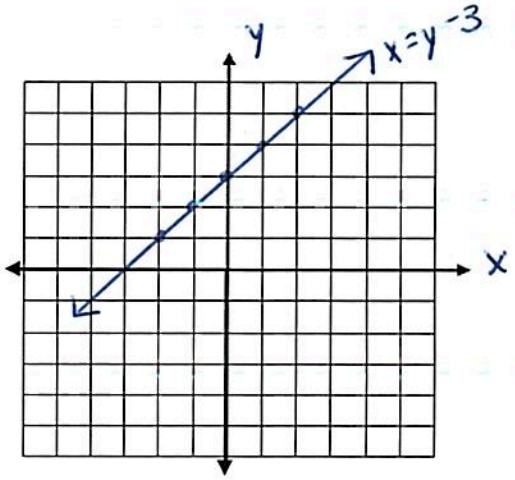
No

The ***standard form*** of a linear function is $Ax + By = C$, where A, B and C are real numbers.
How do we rewrite these functions in $y = mx + b$ form?

2) Graph the solutions to $x = y - 3$

$y = x + 3$

x	y
-2	1
-1	2
0	3
1	4
2	5



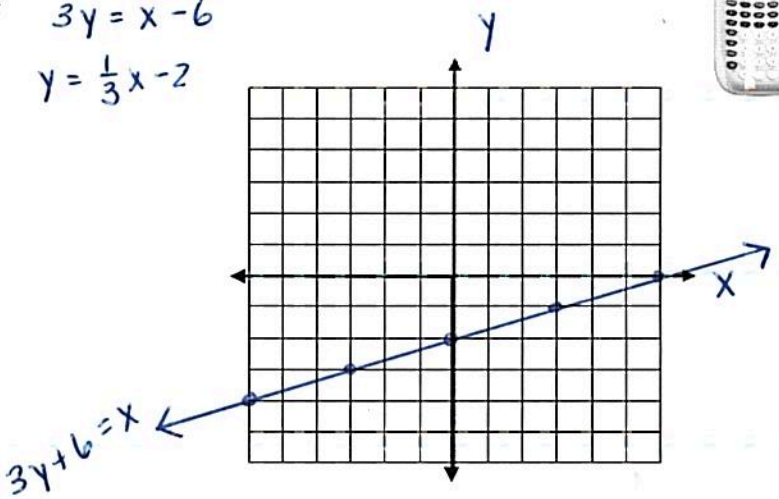
How can the graphing calculator help us graph a linear function?

3) Graph the solutions to $3y + 6 = x$

$3y = x - 6$

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

x	y
-6	-4
-3	-3
0	-2
3	-1
6	0

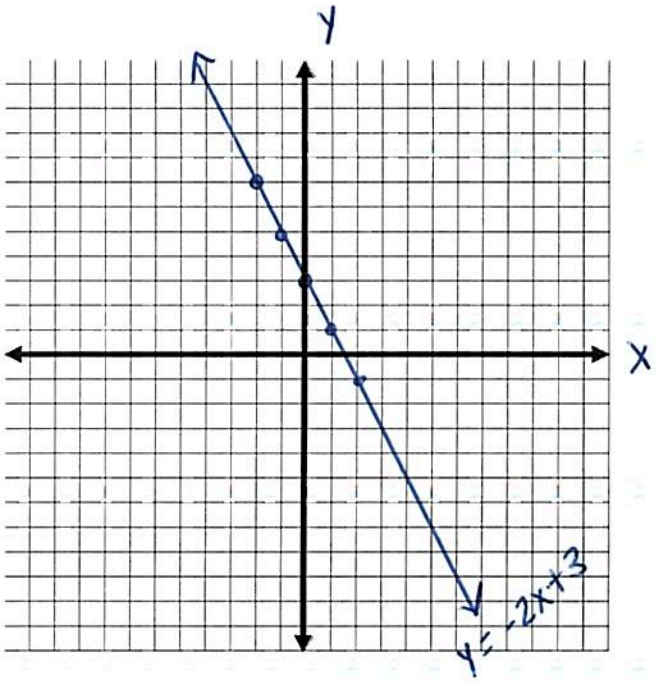


Algebra RH **HW #**

Set up a table of values and draw the graph of each function.

1) $y = -2x + 3$

x	y
-2	7
-1	5
0	3
1	1
2	-1



Domain: $(-\infty, \infty)$

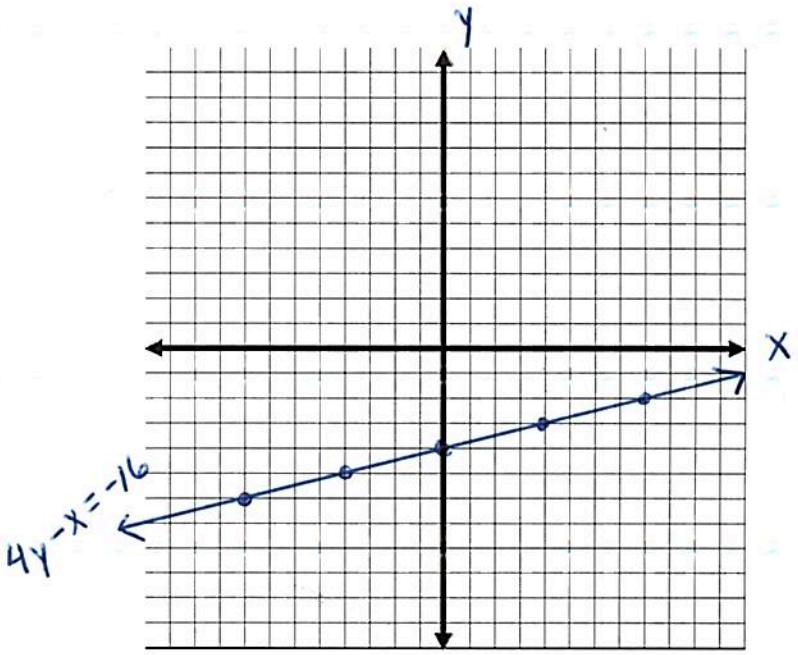
Range: $(-\infty, \infty)$

2) $4y - x = -16$

$4y = x - 16$

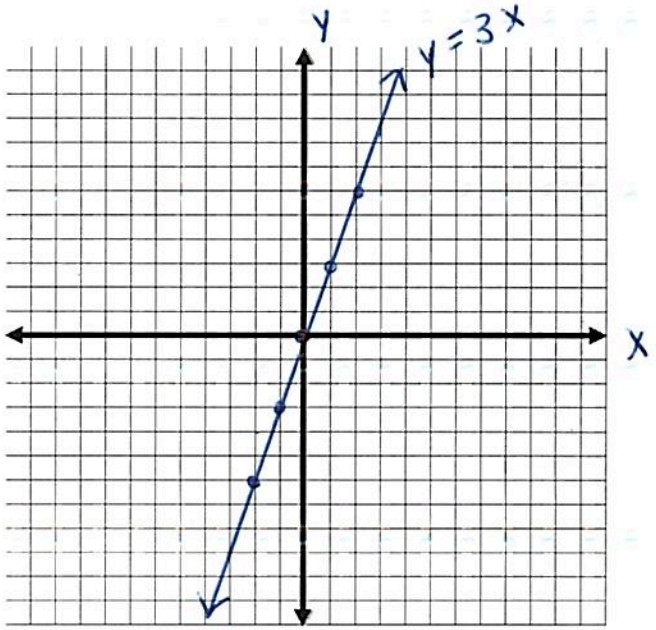
$y = \frac{1}{4}x - 4$

x	y
-8	-6
-4	-5
0	-4
4	-3
8	-2



3) $y = 3x$

x	y
-2	-6
-1	-3
0	0
1	3
2	6



x y

Determine if the point (-25.25, -75.75) is part of the graph of the function $y = 3x$. Justify your response.

$y = 3x$

$-75.75 = 3(-25.25)$

$-75.75 = -75.75$

Yes, the point is part of the graph because, when substituted into the equation, it makes the equation true.