

Essential Question: How do we graph linear functions?**Do Now:**

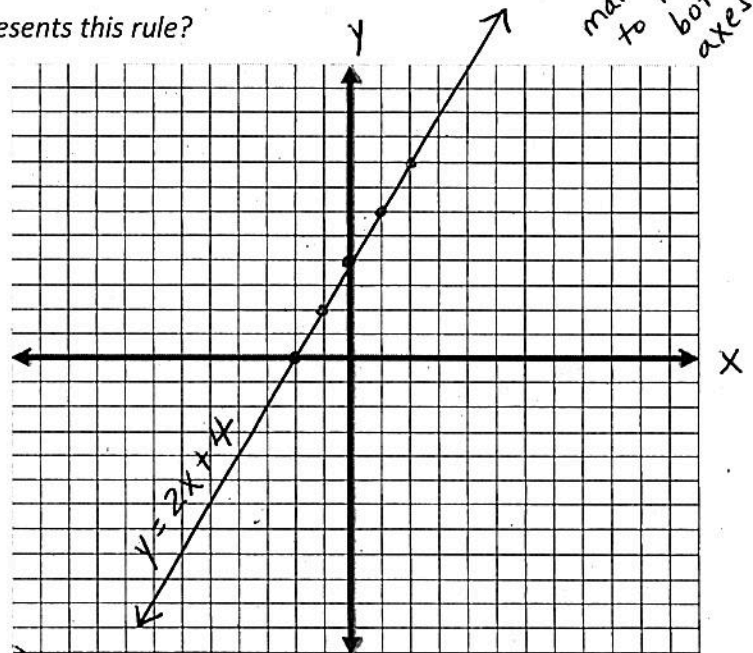
- 1) Recall that a **function** is an input-output relationship that has exactly one output for each input.
- 2) Consider the following function rule: *The output is equal to four more (than) two times the input.*
- 3) Using the variable y to represent the output values and using the variable x to represent the input values, write the function rule algebraically.

Function Rule: _____ $y = 2x + 4$ _____

**Think about this...**

Is it possible to create a graph that represents this rule?

x	$2x + 4$	y	(x, y)
-2	$2(-2) + 4$	0	(-2, 0)
-1	$2(-1) + 4$	2	(-1, 2)
0	$2(0) + 4$	4	(0, 4)
1	$2(1) + 4$	6	(1, 6)
2	$2(2) + 4$	8	(2, 8)



Domain of the Function: _____ $(-\infty, \infty)$ _____

Range of the Function: _____ $(-\infty, \infty)$ _____

Linear Functions

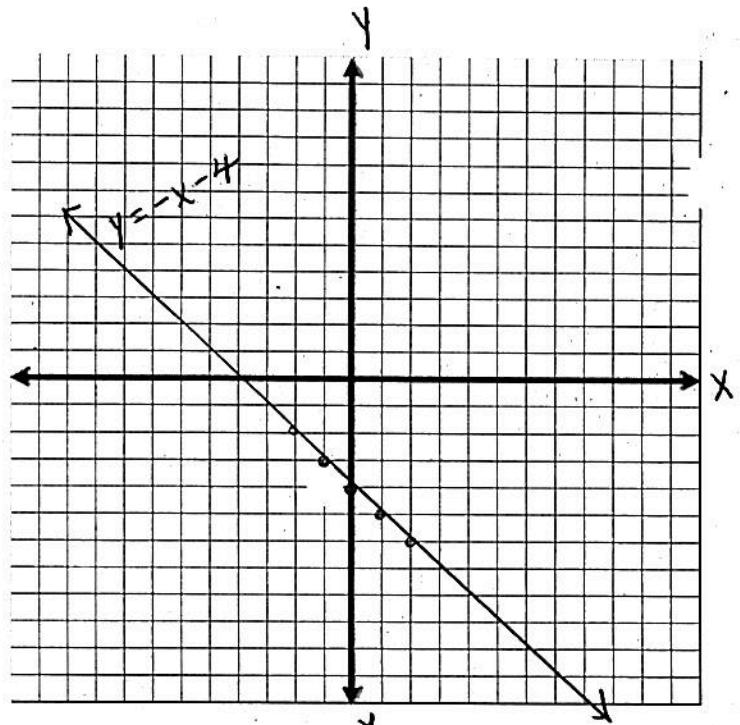
- A **linear function** is a function whose graph is a straight line.
- Linear functions can be graphed by setting up a table of inputs and outputs (*table of values*)
- How do we create a table of x and y values?
 - If the coefficient of x is an integer, use x values -2, -1, 0, 1, 2
 - If the coefficient of x is a fraction, use multiples of the denominator for your x values
- How do we graph the line?
 - Plot the points in the table, connect them and draw an extended line
 - Label the line with the equation

Reminder: The table of values only shows *some* of the input and output values. The graph displays all of the input and output values.

Let's try some more examples....

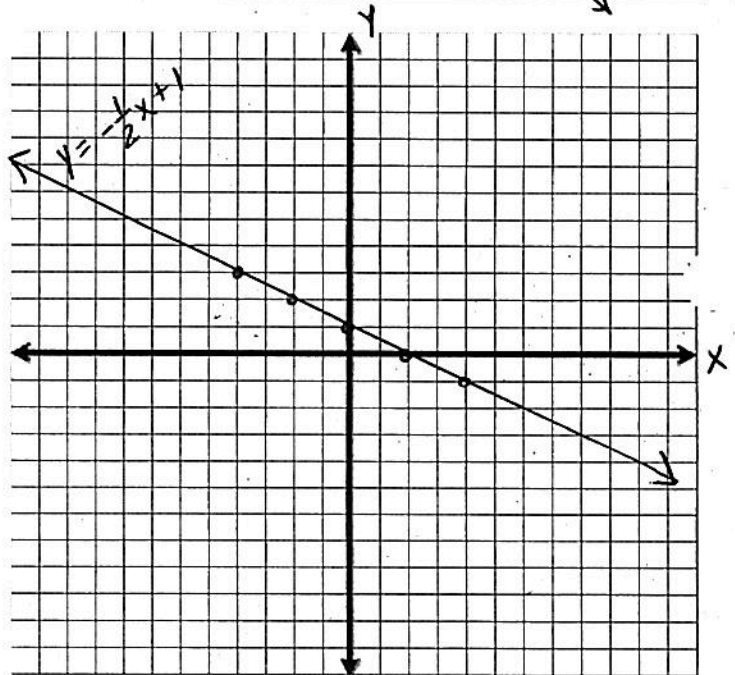
1. Draw the graph of $y = -x - 4$

x	$-x - 4$	y	(x, y)
-2	$-(-2) - 4$	-2	(-2, -2)
-1	$-(-1) - 4$	-3	(-1, -3)
0	$-(0) - 4$	-4	(0, -4)
1	$-(1) - 4$	-5	(1, -5)
2	$-(2) - 4$	-6	(2, -6)



2. Draw the graph of $y = -\frac{1}{2}x + 1$

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)



Think about this...

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

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

If the ordered pair is part of a graph, it will make the equation of the graph true (when you substitute the values in for x and y)

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

<p>Ⓐ (585, -291.5)</p> <p>$-291.5 = -\frac{1}{2}(585) + 1$</p> <p>$-291.5 = -292.5 + 1$</p> <p>$-291.5 = -291.5$</p> <p>✓</p> <p>Yes, this solution works and is part of the graph</p>	<p>Ⓑ (426, -214)</p> <p>$-214 = -\frac{1}{2}(426) + 1$</p> <p>$-214 = -213 + 1$</p> <p>$-214 \neq -212$</p> <p>X</p> <p>No, this ordered pair does not work and is not part of the graph.</p>
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The TAKEAWAY

A linear function is a function whose graph is a picture of a straight line.

All the ordered pairs on the line represent all the input and output values of the function.

In order to graph a linear function, create a table of values.

In general, when choosing the x -values for the table, use $-2, -1, 0, 1, 2$ when the coefficient of x is an integer and use multiples of the denominator when the coefficient of x is a fraction.

8 Algebra CC

HW #

Set up a table of values and draw the graph of each function. State the domain and range in interval notation.

1) $y = -2x + 3$

