Name _____

4-3 Graphing a Function Rule

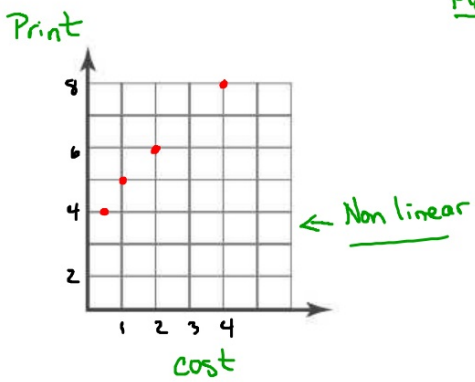
OBJECTIVE: I can graph equations that represent functions

Warm-Up

You are paying to print pictures from your digital camera at the photo shop. You choose one size for all your prints. What is one possible graph of the relationship between the total cost and the number of pictures you print?

Many graph options

- The axis could be flip
- The second dimension could have been used. (6, 7, 8, 10)
- Could have used the area of the prints size (24, 35, 48, 80)



Essential Understanding

Essential Understanding The set of all solutions of an equation forms the equation's graph. A graph may include solutions that do not appear in a table. A real-world graph should only show points that make sense in the given situation.

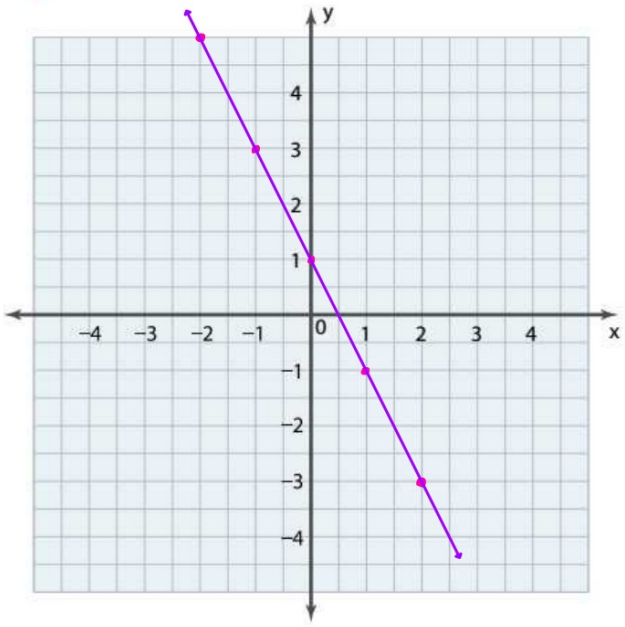
Example #1 Graphing a Function Rule

What is the graph of the function rule $y = -2x + 1$?

Step 1 Make a table of values

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

Step 2 Graph the ordered pairs.

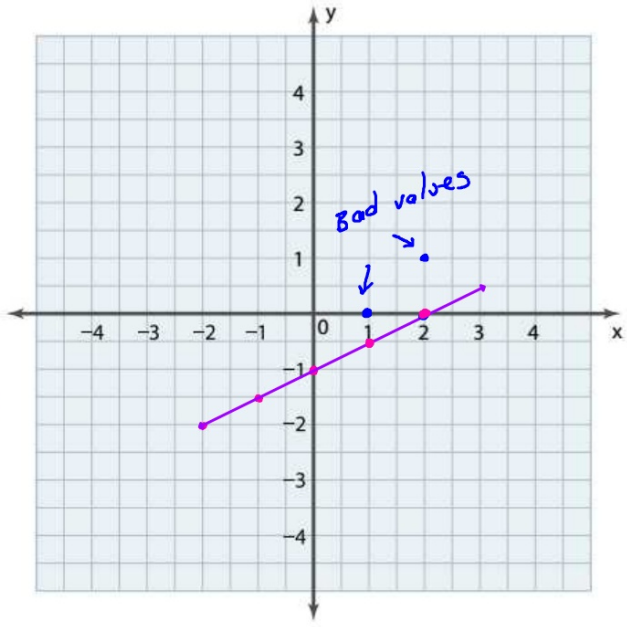


Your Turn to Work it Out

1. What is the graph of the function rule $y = \frac{1}{2}x - 1$?

x	$y = \frac{1}{2}x - 1$	(x , y)
−2	$\frac{1}{2}(-2) - 1 = -\frac{2}{2} - 1$	(-2 , -2)
−1	$\frac{1}{2}(-1) - 1 = -\frac{1}{2} - 1$	(-1 , $-1\frac{1}{2}$)
0	$\frac{1}{2}(0) - 1 = 0 - 1$	(0 , -1)
1	$\frac{1}{2}(1) - 1 = .5 - 1$	(1 , -.5)
2	$\frac{1}{2}(2) - 1 = \frac{2}{2} - 1$	(2 , 0)

Always use the table to verify the graph and the graph to verify the table

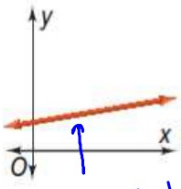


Concept Understanding

Key Concept:

Continuous Graph

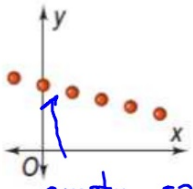
A **continuous graph** is a graph that is unbroken.



values between the selected

Discrete Graph

A **discrete graph** is composed of distinct, isolated points.



empty space between selected values.

Example

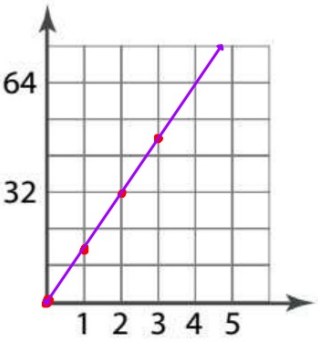
#3 Identifying Continuous and Discrete Graphs

Farmer's Market A local cheese maker is making cheddar cheese to sell at a farmer's market. The amount of milk used to make the cheese and the price at which he sells the cheese are shown. Write a function for each situation. Graph each function. Is the graph continuous or discrete?

1 gal of milk makes 16 oz of cheddar cheese.

Pattern

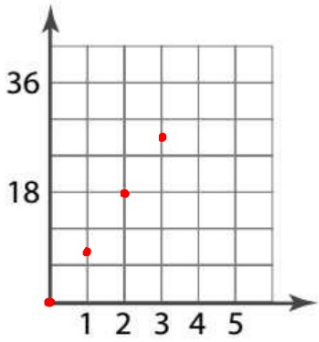
m	0	1	2	3
w	0	16	32	48



Each wheel of cheddar cheese costs $9.

Pattern

n	0	1	2	3
a	0	9	18	27



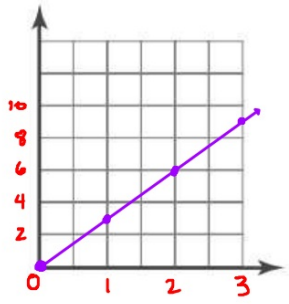
Your Turn to Work it Out

3. Graph the function rule. Is the graph continuous or discrete?
a. The amount of water w in a wading pool, in gallons, depends on the amount of time t, in minutes, the wading pool has been filling, as related by the function rule $w = 3t$.

t	0	1	2	3
w	0	3	6	9

Could you find out the amount of water in 1.5 minutes?

Continuous



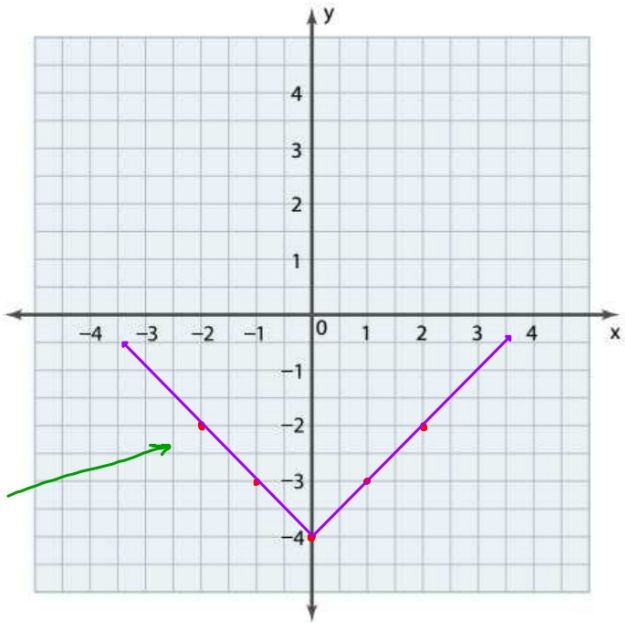
Example #4 Graphing Nonlinear Function Rules

What is the graph of each function rule?

$y = |x| - 4$

x	$y = \|x\| - 4$	(x , y)
−2	$\|-2\| - 4 = 2 - 4$	(−2, −2)
−1	$\|-1\| - 4 = 1 - 4$	(−1, −3)
0	$\|0\| - 4 = 0 - 4$	(0, −4)
1	$\|1\| - 4 = 1 - 4$	(1, −3)
2	$\|2\| - 4 = 2 - 4$	(2, −2)

shape of all $|x|$ absolute graphs.



Your Turn to Work it Out

What is the graph of each function rule?

$y = x^2 + 1$

x	$y = x^2 + 1$	(x , y)
−2	$(-2)^2 + 1 = 4 + 1$	(−2, 5)
−1	$(-1)^2 + 1 = 1 + 1$	(−1, 2)
0	$(0)^2 + 1 = 0 + 1$	(0, 1)
1	$(1)^2 + 1 = 1 + 1$	(1, 2)
2	$(2)^2 + 1 = 4 + 1$	(2, 5)

Shape of all x^2 (quadratic) graphs