

Plug-in a # for  $x$  to get an answer for  $y$

**Lesson 13: The Graph of a Linear Equation in Two Variables**

Classwork

Exercises

1. Find at least ten solutions to the linear equation  $3x + y = -8$ , and plot the points on a coordinate plane.

$x$	Linear Equation: $3x + y = -8$	$y$
0	$3(0) + y = -8$	-8
1	$3(1) + y = -8$	-11
2	$3(2) + y = -8$	-14
3	$3(3) + y = -8$	-17
4	$3(4) + y = -8$	-20
-1	$3(-1) + y = -8$	-5
-2	$3(-2) + y = -8$	-2
-3	$3(-3) + y = -8$	1
-4	$3(-4) + y = -8$	4
-5	$3(-5) + y = -8$	7

output

input

$(0, -8)$   
 $(1, -11)$   
 $(2, -14)$   
 $(3, -17)$   
 $(4, -20)$   
 $(-1, -5)$   
 $(-2, -2)$   
 $(-3, 1)$   
 $(-4, 4)$   
 $(-5, 7)$

$0 + y = -8$   
 $y = -8$

$3 + y = -8$   
 $y = -11$

$6 + y = -8$   
 $y = -14$

$9 + y = -8$   
 $y = -17$

$12 + y = -8$   
 $y = -20$

$-3 + y = -8$   
 $+3$   
 $y = -5$

$-6 + y = -8$   
 $+6$   
 $y = -2$

$-9 + y = -8$   
 $+9$   
 $y = 1$

$-12 + y = -8$   
 $+12$   
 $y = 4$

$-15 + y = -8$   
 $+15$   
 $y = 7$

What shape is the graph of the linear equation taking?



3. Compare the solutions you found in Exercise 1 with a partner. Add their solutions to your graph.

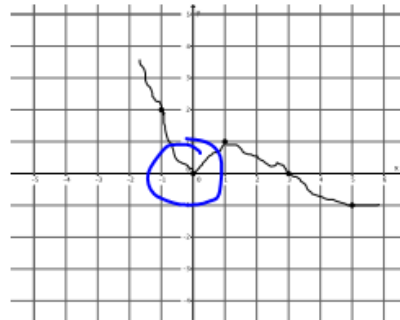
Is the prediction you made about the shape of the graph still true? Explain.

4. Compare the solutions you found in Exercise 2 with a partner. Add their solutions to your graph.

Is the prediction you made about the shape of the graph still true? Explain.

5. Joey predicts that the graph of  $-x + 2y = 3$  will look like the graph shown below. Do you agree? Explain why or why not.

$$\begin{aligned} (0, 0) \\ -(0) + 2(0) &= 3 \\ 0 + 0 &= 3 \\ 0 &\neq 3 \end{aligned}$$



6. We have looked at some equations that appear to be lines. Can you write an equation that has solutions that do not form a line? Try to come up with one, and prove your assertion on the coordinate plane.

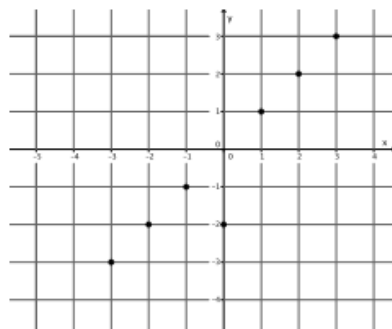
I do not agree with Joey. The graph shown below does not fit with the given equation. If we

## Lesson Summary

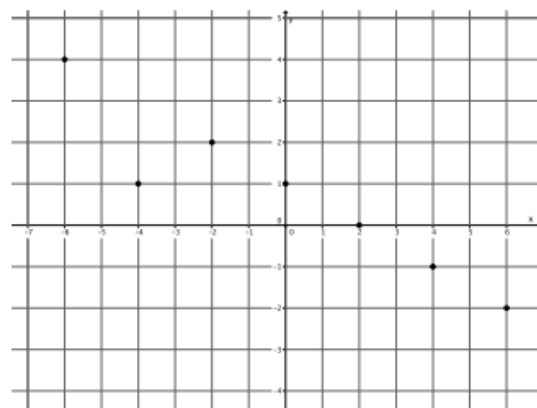
One way to determine if a given point is on the graph of a linear equation is by checking to see if it is a solution to the equation. At this point, all graphs of linear equations appear to be lines.

## Problem Set

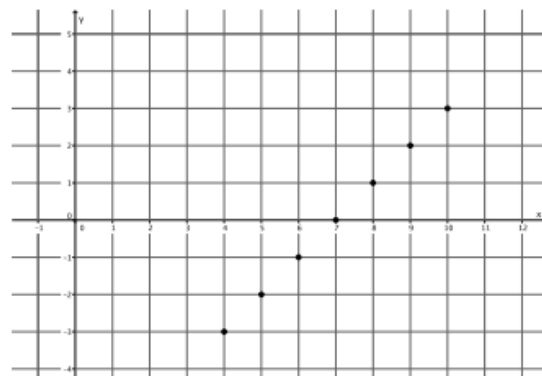
- Find at least ten solutions to the linear equation  $\frac{1}{2}x + y = 5$ , and plot the points on a coordinate plane. What shape is the graph of the linear equation taking?
- Can the following points be on the graph of the equation  $x - y = 0$ ? Explain.



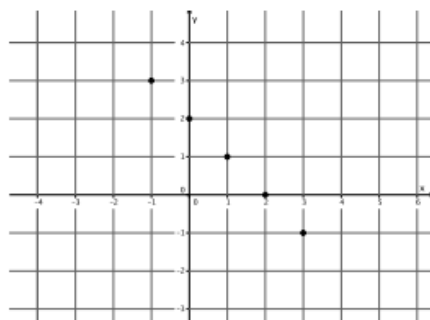
3. Can the following points be on the graph of the equation  $x + 2y = 2$ ? Explain.



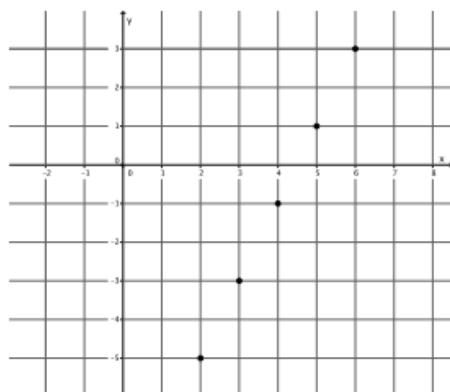
4. Can the following points be on the graph of the equation  $x - y = 7$ ? Explain.



5. Can the following points be on the graph of the equation  $x + y = 2$ ? Explain.



6. Can the following points be on the graph of the equation  $2x - y = 9$ ? Explain.



7. Can the following points be on the graph of the equation  $x - y = 1$ ? Explain.

