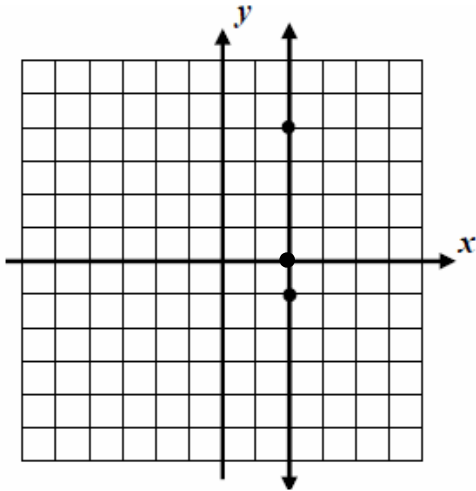


**Essential Question:** How can we identify the equations of vertical lines?

**Do Now:** Pictured below is the graph of a **vertical line**.



- a) Name three points on the line.  
 (   ,   ) (   ,   ) (   ,   )
- b) What do these three points have in common?

## Graphing Vertical Lines

**Example 1:**

**Consider:**  $x + 0y = 5$

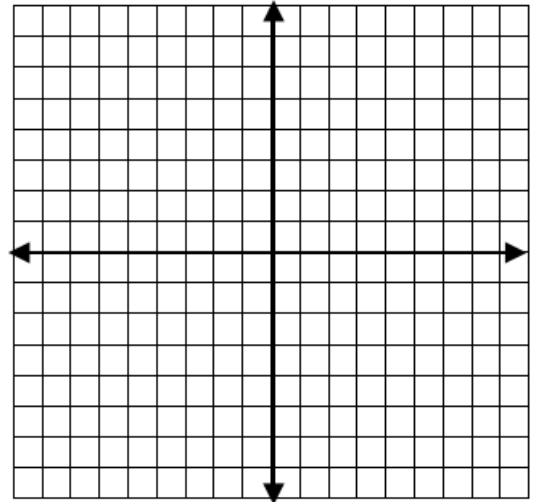
**Equation:** \_\_\_\_\_

The equation of a vertical line is  $x = a$ , where  $a$  is any real number.

The  $x$ -value for the points that make up this equation is always  $a$  regardless of the  $y$ -value.

Graph  $x = 5$

$x$	$y$

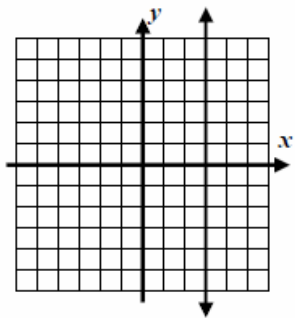


**Domain:** \_\_\_\_\_

**Range:** \_\_\_\_\_

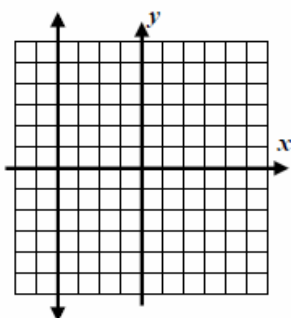
For each of the following, write the equation of the line shown or described.

(a)



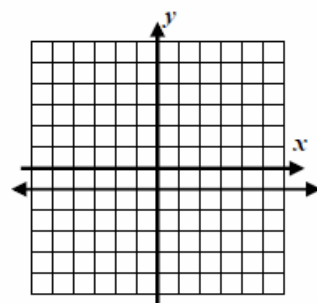
EQUATION: \_\_\_\_\_

(b)



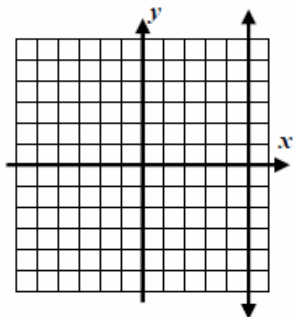
EQUATION: \_\_\_\_\_

(c)



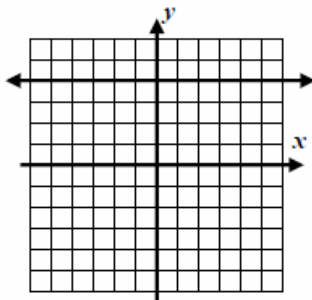
EQUATION: \_\_\_\_\_

(d)



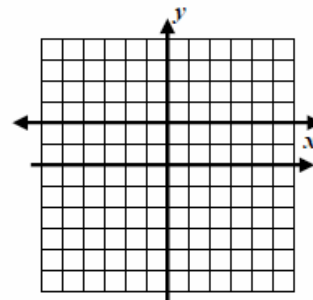
EQUATION: \_\_\_\_\_

(e)



EQUATION: \_\_\_\_\_

(f)



EQUATION: \_\_\_\_\_

(g) The equation of a vertical line passing through the point  $(-4, 5)$ .

(h) The equation of a horizontal line passing through the point  $(3, 2)$ .



**Think about this...**are horizontal and vertical lines functions? Explain.



The graphs of linear equations are pictures of diagonal, vertical and horizontal lines.

- A linear equation with both  $x$  and  $y$  terms will graph as a \_\_\_\_\_ line.
- A linear equation with only an  $x$  term will graph as a \_\_\_\_\_ line.
- A linear equation with only a  $y$  term will graph as a \_\_\_\_\_ line.



### One more thought...

The  $x$  and  $y$ -axes are horizontal and vertical lines. Can they be represented by equations?

What is the equation of the line that represents the  $x$ -axis?

What is the equation of the line that represents the  $y$ -axis?

Let's review what we have learned up until this point.



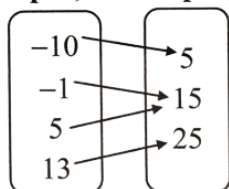
Determine if each relation is a function. Justify your response by explaining your reasoning.

1.  $(-3, 1), (0, 0), (3, 1), (6, 4), (9, 0)$

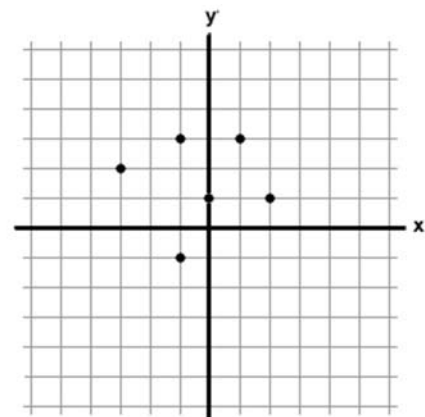
2.

Domain	Range
4	1.5
-2	3
-2	3.5
0	4.5

3. Input,  $x$     Output,  $y$



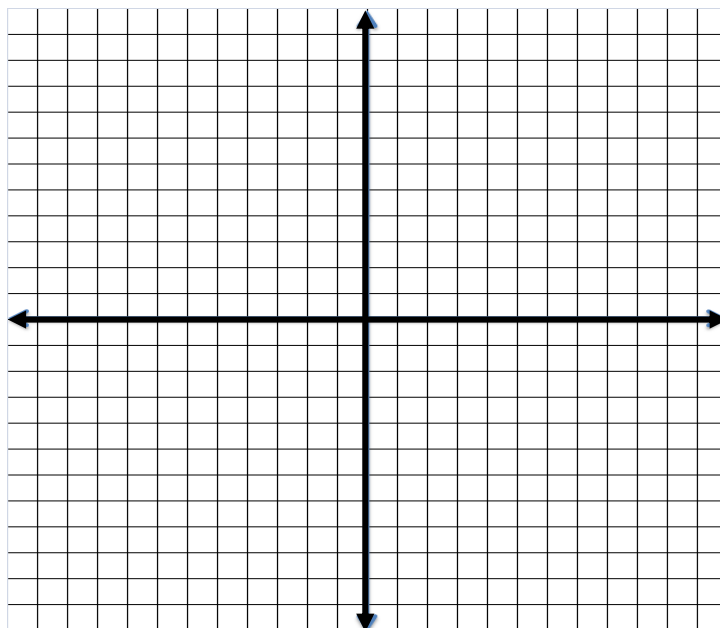
4.



5. Graph the following linear function by creating a table of values. *Check all graphs with your calculator.*

$$x - 3y = 6$$

$x$	$y$



Consider the function  $x - 3y = 6$  graphed above. Is the point  $(696, 230)$  part of the line? Justify your response.

6. Graph the lines defined by the equations  $x = 4$  and  $y = -5$  on the same set of axes. Name the ordered pair where the two lines intersect.

