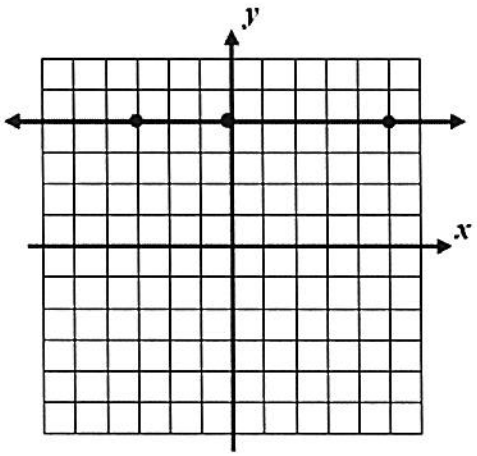
**Essential Question:** How can we identify the equations of horizontal lines?

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




a) Name three points on the line.

(-3, 4) (0, 4) (5, 4)

b) What do these three points have in common?

The outputs (y-values) is the same.

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# Graphing Horizontal Lines

**Example 1:**

Consider: $0x + y = 2$

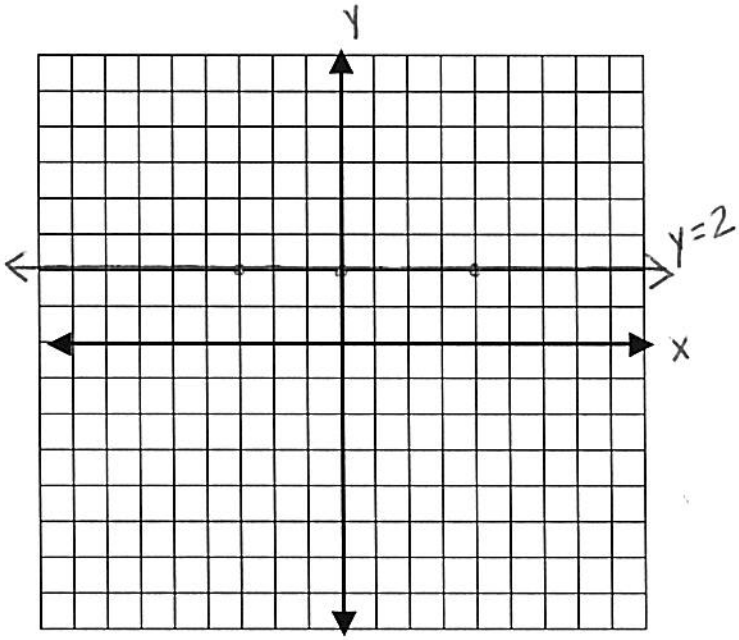
Equation: $y = 2$

The equation of a horizontal line is $y = b$, where $b$ is any real number.

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

Graph $y = 2$

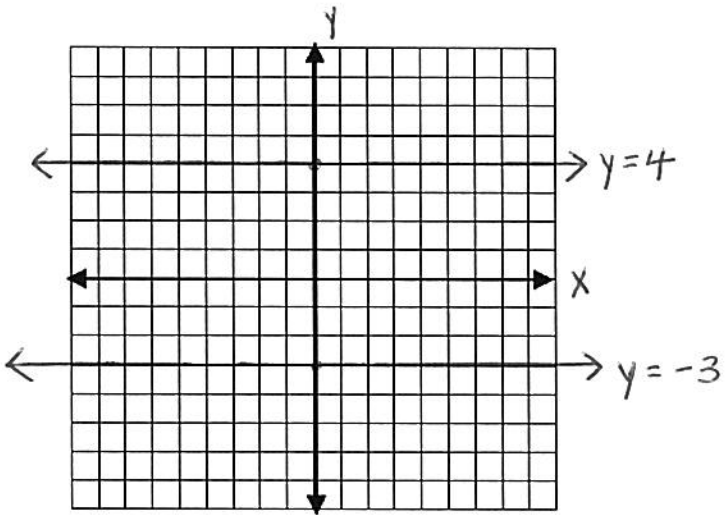
| x | y |
|---|---|
| -3 | 2 |
| 0 | 2 |
| 4 | 2 |



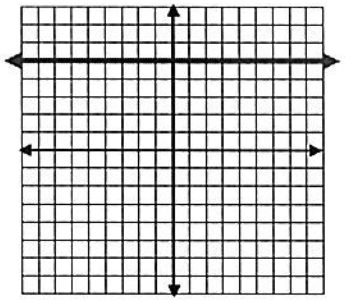

**Domain:** $(-\infty, \infty)$ x is all real numbers

**Range:** [2] y=2

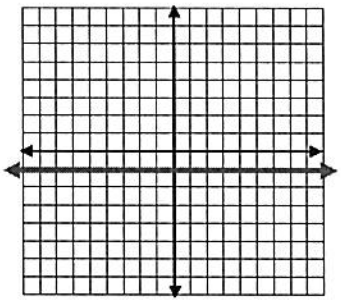
**Example 2:** On the graph below, graph the linear equations y = 4 and y = -3.



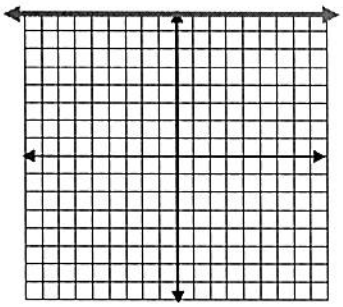

**For each of the following, write the equation of the lines shown.**



y = 5



y = -1



y = 8

**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. (1, -7), (1, -5), (2, -4), (3, -1), (4, 1)

Not a function

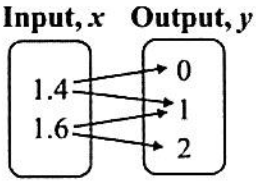
An input has two different outputs.

2.

| Input | Output |
|---|---|
| 6 | -9 |
| 7 | -9 |
| 8 | -9 |

Function because every input has only one output

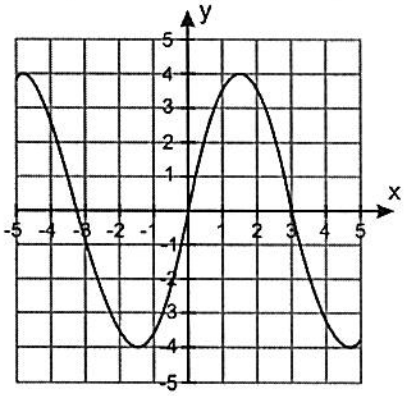
3.




not a function

two inputs have two different outputs

4.




function because it passes the vertical line test

5. Let ***x*** represent the number of each month (For example ***x*** = 1 for January).
Let ***y*** represent the number of days in month ***x***. *Do not consider a leap year.*

a. Complete the table.

January February

| Input, x | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Output, y | 31 | 28 | 31 | 30 | 31 | 30 | 31 | 31 | 30 | 31 | 30 | 31 |

b. Does the relation represent a function? Explain.

The relation represents a function because each input has only one output.

c. If you switch the inputs and outputs of this relation, is the resulting relation a function? Explain.

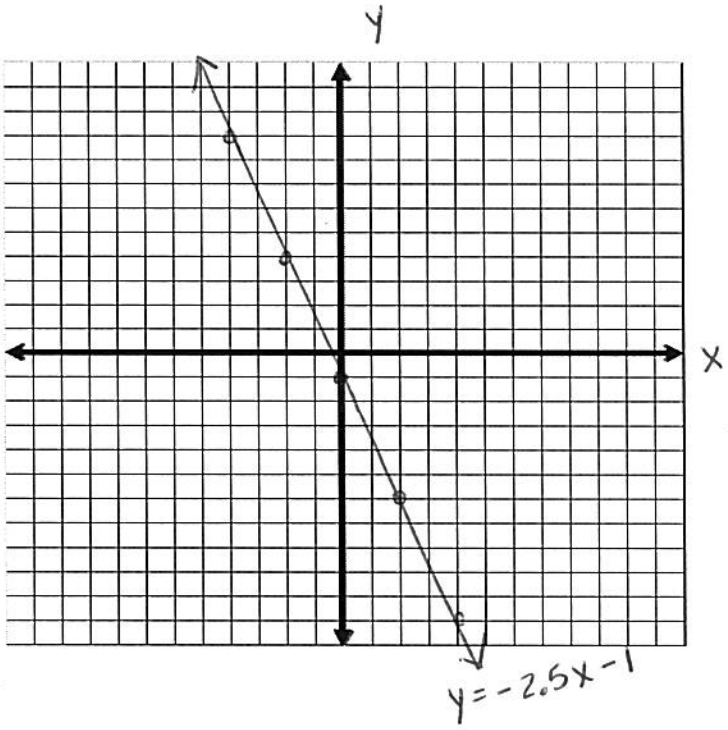
The resulting relation would not be a function because some inputs - 30 and 31 - would have different outputs

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

a. $y = -2.5x - 1$

| x | y |
|---|---|
| -4 | 9 |
| -2 | 4 |
| 0 | -1 |
| 2 | -6 |
| 4 | -11 |
| 6 | -16 |
| 8 | -21 |
| 10 | -26 |

you don't have to graph every point from your table in order to see the linear pattern




b. $-5x + 5y = 25$

| x | y |
|---|---|
| -3 | 2 |
| -2 | 3 |
| -1 | 4 |
| 0 | 5 |
| 1 | 6 |
| 2 | 7 |
| 3 | 8 |
| 4 | 9 |

$-5x+5y=25$
$+5x \quad +5x$

$\frac{5y}{5} = \frac{5x}{5} + \frac{25}{5}$

$y = x+5$