

### Solutions to Linear Equations

Linear Equation: An equation whose graph forms a line.

Tell whether the ordered pair is a solution of  $2x - y = 5$

1.  $(1, -3)$

$$2(1) - (-3) = 5 ?$$

$$2 + 3 = 5$$

yes ☺

2.  $(5, 7)$

$$2(5) - (7) = 5 ?$$

$$10 - 7 = 5$$

NO ☹

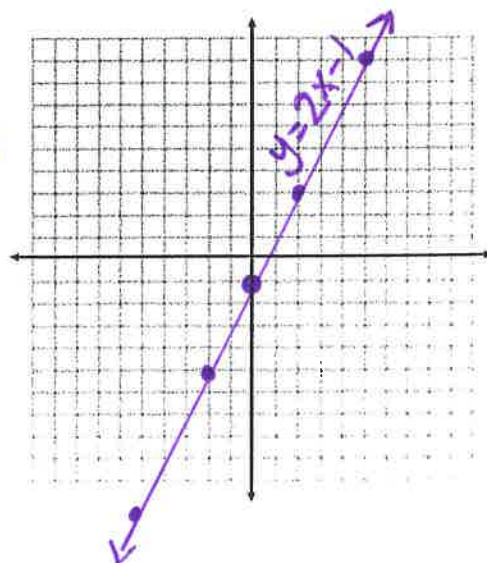
### Find the Solution to a Linear Equation

Input: domain, x coordinate, independent var

Output: range, y coordinate, dependent var.

Steps for finding all solutions to a Linear Equation:

1. Make a Table ✓
2. Choose x-values ✓
3. Input x into the function then find the y-value ✓
4. Make ordered pairs (x,y) ✓
5. Graph the ordered pair ✓



label the line!

Graph  $y = 2x - 1$

$$y = 2(-5) - 1$$

$$= -10 - 1$$

$$= -11$$

$$y = 2(-2) - 1$$

$$= -4 - 1$$

$$= -5$$

$$y = 2(0) - 1$$

$$= 0 - 1$$

$$= -1$$

$$y = 2(2) - 1$$

$$= 4 - 1$$

$$= 3$$

$$y = 2(5) - 1$$

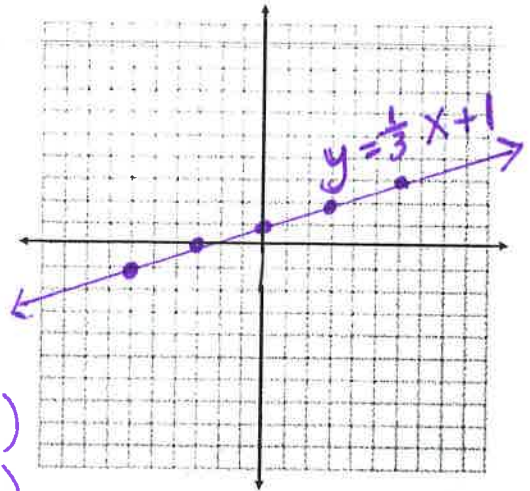
$$= 10 - 1$$

$$= 9$$

x	y
-5	-11 → (-5, -11)
-2	-5 → (-2, -5)
0	-1 → (0, -1)
2	3 → (2, 3)
5	9 → (5, 9)

Steps for finding all solutions to a Linear Equation:

1. Make a Table
2. Choose x-values
3. Input x into the function then find the y-value
4. Make ordered pairs (x,y)
5. Graph the ordered pair



Graph  $y = \frac{1}{3}x + 1$

$$y = \frac{1}{3}(-6) + 1$$

$$= -2 + 1$$

$$= -1$$

$$y = \frac{1}{3}(-3) + 1$$

$$= -1 + 1$$

$$= 0$$

$$y = \frac{1}{3}(0) + 1$$

$$= 0 + 1$$

$$= 1$$

x	y
-6	-1 → (-6, -1)
-3	0 → (-3, 0)
0	1 → (0, 1)
3	2 → (3, 2)
6	3 → (6, 3)

$$y = \frac{1}{3}(3) + 1$$

$$= 1 + 1$$

$$= 2$$

$$y = \frac{1}{3}(6) + 1$$

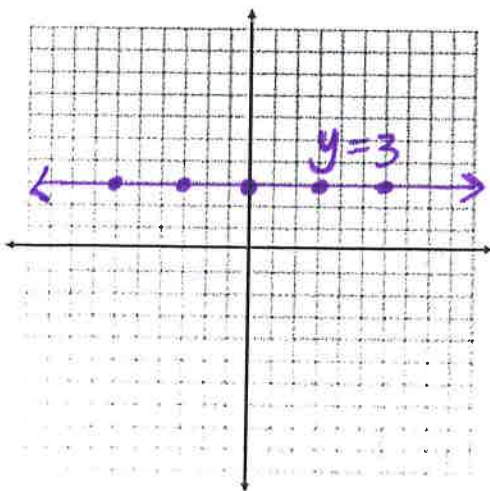
$$= 2 + 1$$

$$= 3$$

### Special Lines

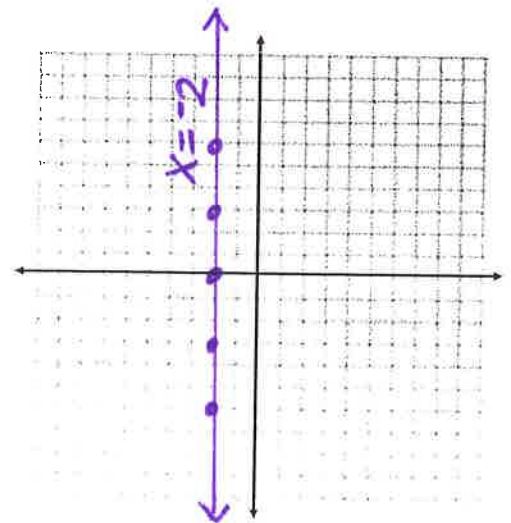
1. Graph  $y = 3$

x	y
-6	3
-3	3
0	3
3	3
6	3



2. Graph  $x = -2$

x	y
-2	-6
-2	-3
-2	0
-2	3
-2	6



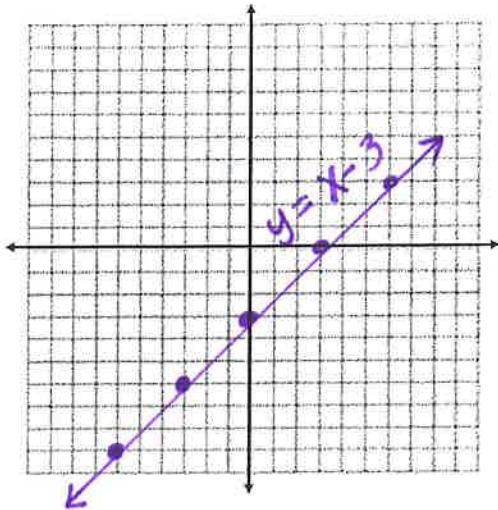
if "y" is a constant,  
then the line will  
be horizontal

if "x" is a constant,  
then the line will  
be vertical.

Graph the lines below:

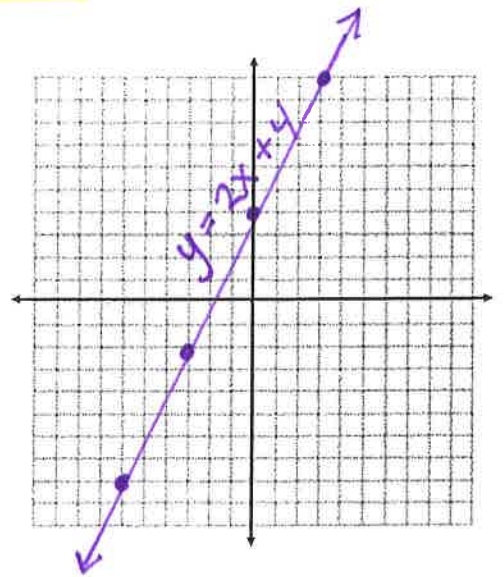
1. Graph  $y = x - 3$

x	y
-6	-9
-3	-6
0	-3
3	0
6	3



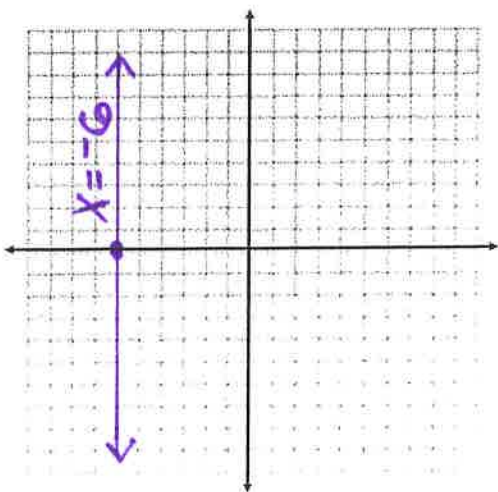
2. Graph  $y = 2x + 4$

x	y
-6	-8
-3	-2
0	4
3	10
6	16



3. Graph  $x = -6$

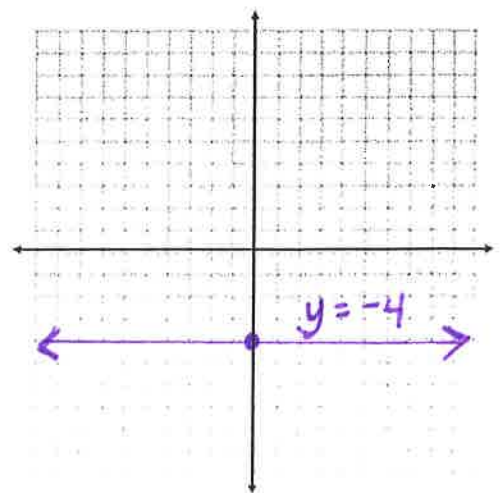
x	y
-6	-6
-6	-3
-6	0
-6	3
-6	6



vertical  
line

4. Graph  $y = -4$

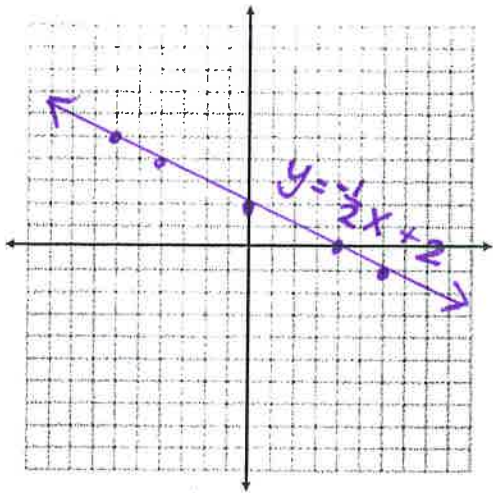
x	y
-6	-4
-3	-4
0	-4
3	-4
6	-4



horizontal  
line

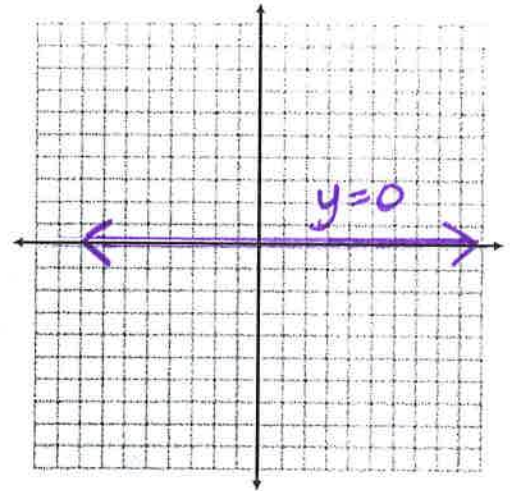
5. Graph  $y = -\frac{1}{2}x + 2$

x	y
-6	5
-4	4
0	2
4	0
6	-1



6. Graph  $y = 0$

x	y
-6	0
-3	0
0	0
3	0
6	0



Tell whether the ordered pair is a solution:

7.  $y = 3x + 7$ ;  $(-3, 2)$

$$\begin{aligned} 2 & \stackrel{?}{=} 3(-3) + 7 \\ 2 & \stackrel{?}{=} -9 + 7 \\ 2 & \stackrel{?}{=} -2 \end{aligned}$$

NO

"  
(

8.  $9x - 5y = -9$ ;  $(5, 9)$

$$\begin{aligned} 9(5) - 5(9) & \stackrel{?}{=} -9 \\ 45 - 45 & \stackrel{?}{=} -9 \\ 0 & \stackrel{?}{=} -9 \end{aligned}$$

NO

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