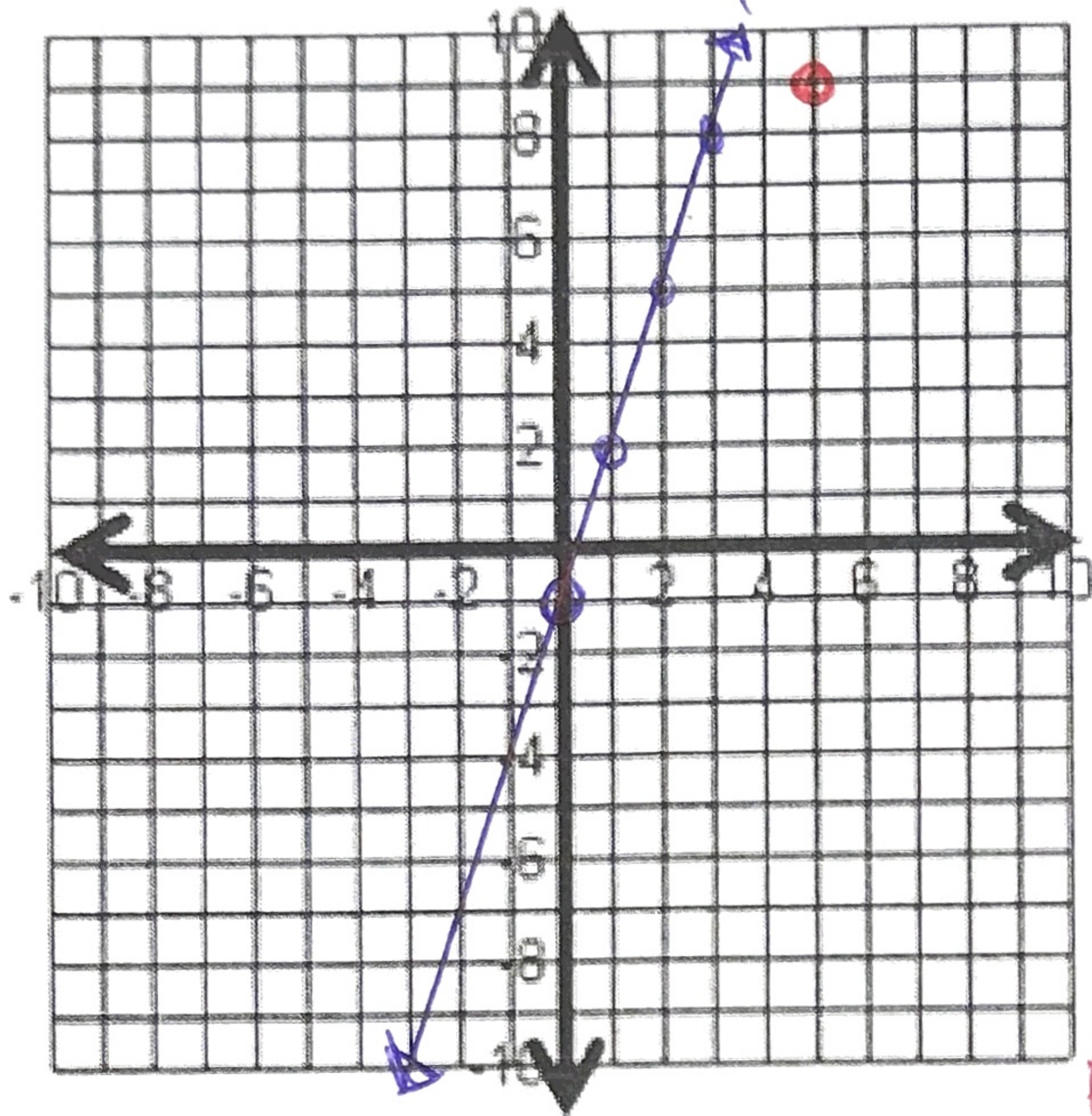


**Unit 3b Day 14: Using Equations to Find Inputs, Outputs, and Solutions**

Focus Question: What does it mean to be a solution to a linear function?

A. The equation for a line is  $y = 3x - 1$ .

1. Graph the line



2. Is (5, 9) a solution? Explain

when you substitute it makes the eq. true

$$y = 3x - 1$$

$$9 = 3(5) - 1$$

$$9 = 14$$

This is false so (5, 9) is Not a solution.

3. Explain your answer to #2 a different way.

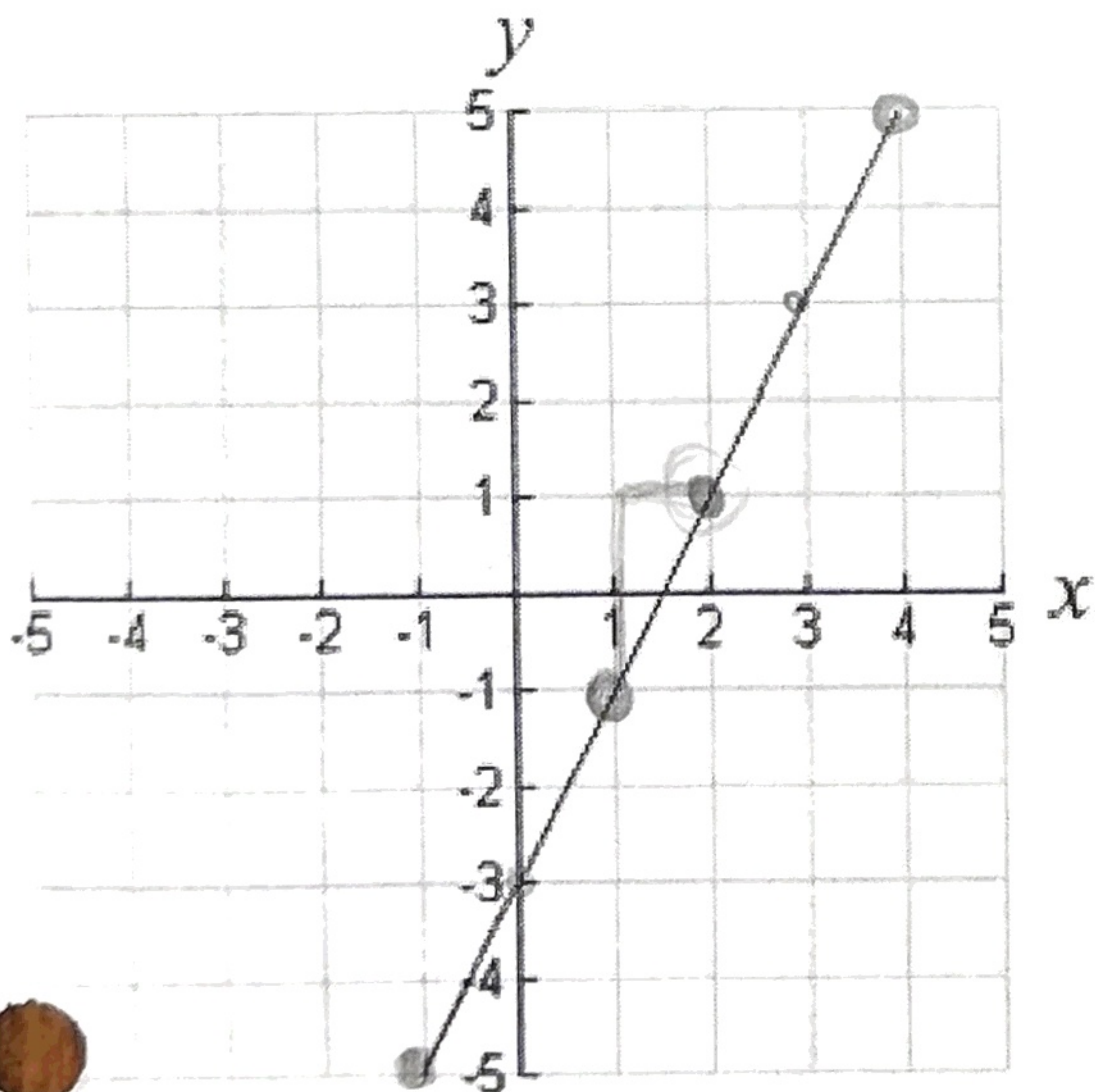
Its not on the line so it is not a solution

A linear function has  $\infty$  solutions.

B. Vocabulary

- Solutions to a linear function** make the equation true when they are substituted into the equation and it is evaluated. They are points that are ON the line.
- Inputs** are the values of the independent variable which is found on the x-axis.
- Outputs** are the values of the dependent variable which is found on the y-axis.

C. Using graphs to find inputs, outputs and solutions.



1. Find the output when the input is 2.

$x = 2$

(2, 1)

The output is 1

2. Find  $f(x) = 5$ ?

tells us  $y = 5$

(4, 5)

$x = 4$

3. Find the input when the output is -1.

$y = -1$

(1, -1)

The input is 1.

4. Find  $f(-1)$ ?

tells us  $x = -1$

(-1, -5)

$f(-1) = -5$

5. What are two solutions to the equation?

(2, 1) or (3, 3) or (0, -3)

y int.

6. What is the equation of the line?

$f(x) = 2x - 3$

D. Using equations to find inputs, outputs, and solutions.

1. Use the equation  $y = -2x + 5$  to answer the following.

a. Find the output when the input is -3.

$$x = -3$$

$$y = -2(-3) + 5$$

$$y = 6 + 5$$

$$y = 11$$

The output is 11

b. What is the input when the output is 7?

$$y = 7$$

$$7 = -2x + 5$$

$$-5 \quad -5$$


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$$\frac{2}{-2} = \frac{-2x}{-2} \quad -1 = x$$

The input is -1

c. Find  $y$  when  $x = 0$ . Then explain what you just found.

$$y = -2(0) + 5$$

$$y = 0 + 5$$

$$y = 5$$

A solution (0, 5) was found. It's the y-intercept.

d. Find  $x$  when  $y = 8$ . Then explain what you just found.

$$8 = -2x + 5$$

$$-5 \quad -5$$


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$$\frac{3}{-2} = \frac{-2x}{-2} \quad x = -\frac{3}{2}$$

A solution  $(-\frac{3}{2}, 8)$  was found.

e. Is (4, -3) a solution? Explain.

$$-3 = -2(4) + 5$$

$$-3 = -8 + 5$$

$$-3 = -3$$

Yes b/c it made the equation true

f. Find another solution to the equation.

① pick an  $x$  value  $x = 2$

② substitute  $y = -2(2) + 5$

$$y = -4 + 5$$

$$y = 1$$

(2, 1)

2. Remember we also did this with function notation: Use the function  $f(x) = \frac{2}{3}x - 6$  to answer the following.

a. Find  $f(-9)$ .  $x = -9$

$$f(-9) = \frac{2}{3}(-9) - 6$$

$$f(-9) = -6 - 6$$

$$f(-9) = -12$$

b. Find  $f(x) = -9$

$$-9 = \frac{2}{3}x - 6$$

$$+6 \quad +6$$

$$\frac{3}{2} \cdot -3 = \frac{2}{3}x \cdot \frac{3}{2}$$

$$\frac{-9}{2} = x$$

c. find  $f(0)$  and explain what you found.

$$f(0) = \frac{2}{3}(0) - 6$$

$$f(0) = 0 - 6$$

$$f(0) = -6$$

The y-int is (0, -6)

d. Find  $f(x) = 0$  and explain what you found.

$$0 = \frac{2}{3}x - 6$$

$$+6 \quad +6$$

$$\frac{3}{2} \cdot 6 = \frac{2}{3}x \cdot \frac{3}{2}$$

$$x = 9$$

The x-int is (9, 0)

e. Is (-3, -2) a solution? Explain.

$$-2 = \frac{2}{3}(-3) - 6$$

$$-2 = -2 - 6$$

$$-2 = -8$$

No b/c  $-2 \neq -8$

f. Give another solution to the function.

① pick an  $x$  value.  $x = 3$

② subst.

$$f(3) = \frac{2}{3}(3) - 6$$

$$f(3) = 2 - 6$$

$$f(3) = -4$$

(3, -4)