Math Virtual Learning

Algebra 1 S2

April 30th, 2020

Algebra 1 S2
Lesson: April 30th, 2020

Learning Target:
Students will solve a system of equations involving a linear and quadratic function graphically.

Set timers to beat your scores.

1. Click here to practice identifying the type of function from the given table.

2. Click here to practice solving systems of equations by graphing.
    -Use desmos to help graph, if you need.

3. Click here to practice finding the number of solutions by graphing the systems of equations.

In today's lesson we will graph a linear and quadratic function at the same time to find the solution to the system of equations.

You can go to https://www.desmos.com/calculator to do all your graphing today.

The solution(s) to a quadratic & linear system are the point(s) of intersection.
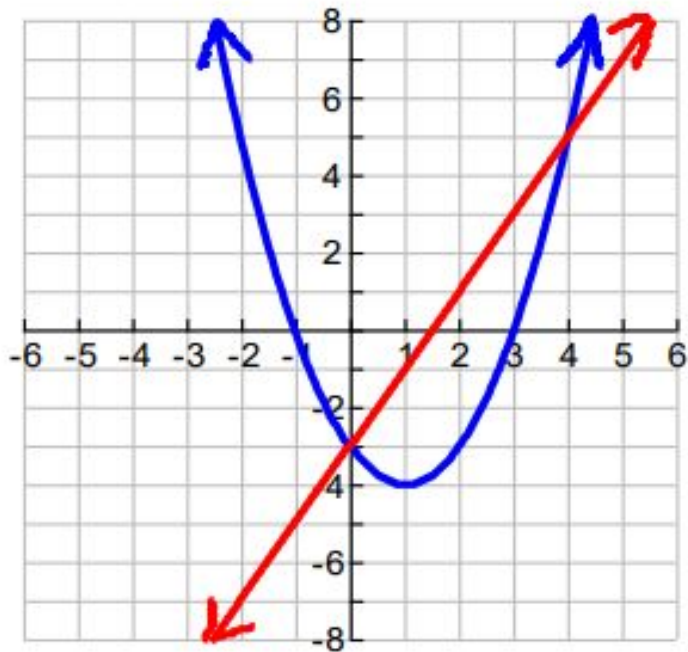
Example 1: $\begin{cases} y = x^2 - 2x - 3 \\ y = 2x - 3 \end{cases}$
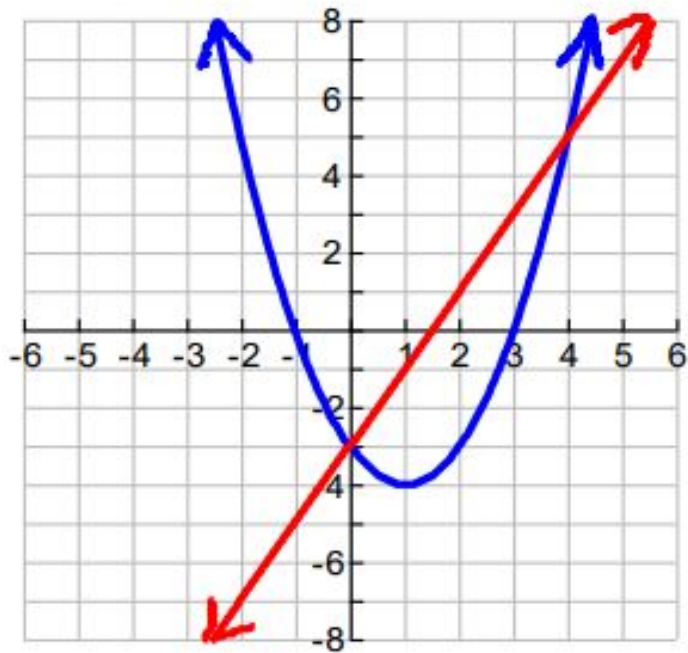
- How many solutions does this system have?

- What are those solutions?

- How can you verify that these solutions work for both equations in the system?

The solution(s) to a quadratic & linear system are the point(s) of intersection.

Example 1: $\begin{cases} y = x^2 - 2x - 3 \\ y = 2x - 3 \end{cases}$

- This system has two solutions because there are two points of intersection

- The solutions are (0, -3) and (4, 5)

- Plug 0 in for x in both equations, calculate the right side and you will get y = -3
  Plug 4 in for x in both equations, calculate and you will get y = 5

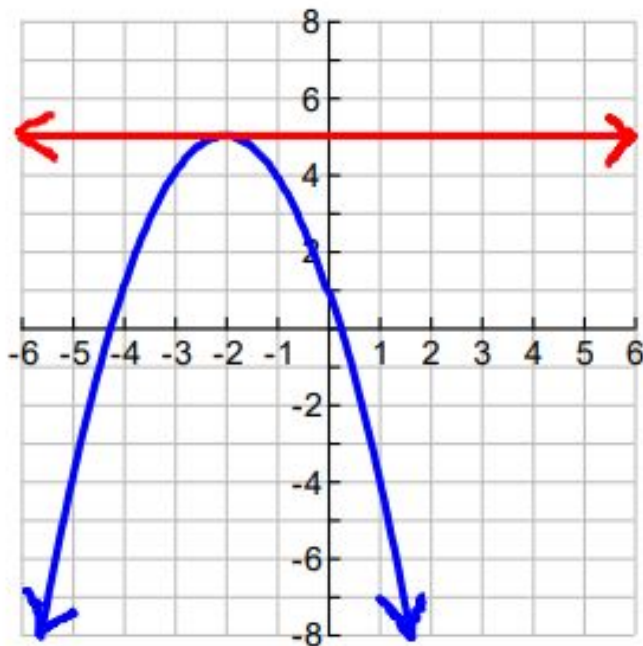The solution(s) to a quadratic & linear system are the point(s) of intersection.

Example 2: $\begin{cases} y = -(x+2)^2 + 5 \\ y = 5 \end{cases}$
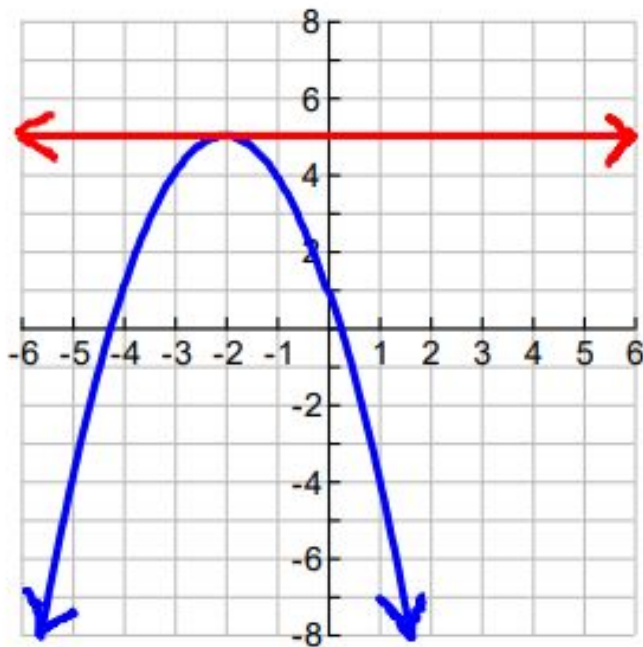
- How many solutions does this system have?

- What are those solutions?

- How can you verify that these solutions work for both equations in the system?

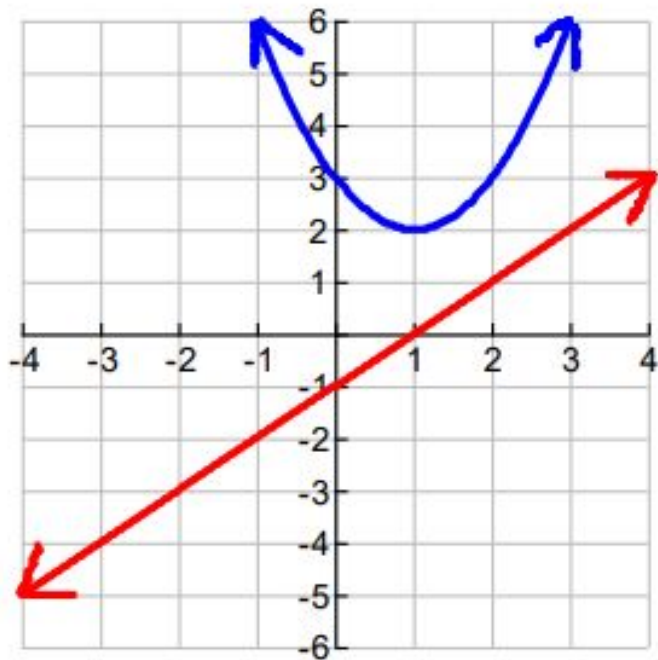# The solution(s) to a quadratic & linear system are the point(s) of intersection.

Example 2: $\begin{cases} y = -(x+2)^2 + 5 \\ y = 5 \end{cases}$

- Only one solution since there is only one point of intersection.

- The solution is the point (-2, 5)

- Plug -2 in for x in the top equation, calculate the right side and you will get y = 5. In the bottom equation we already know y = 5 for any value of x.

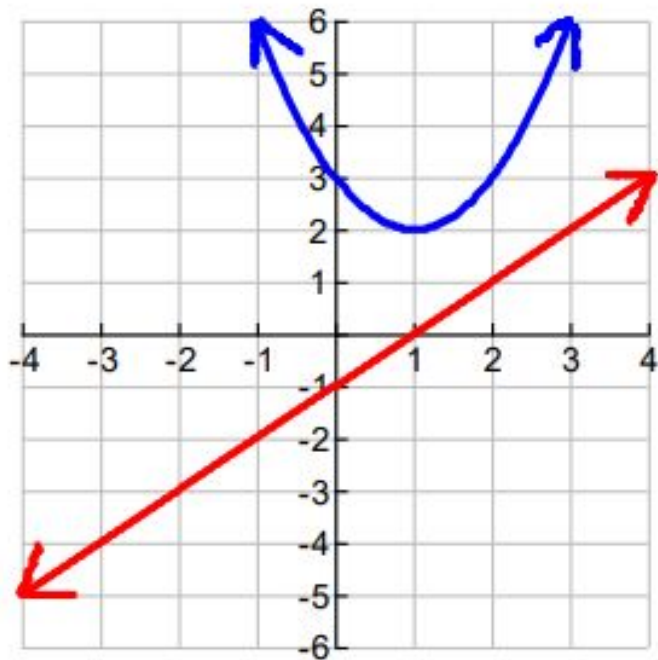The solution(s) to a quadratic & linear system are the point(s) of intersection.

Example 3:
$$\begin{cases} y = x^2 - 2x + 4 \\ y = x - 1 \end{cases}$$

- How many solutions does this system have?

- What are those solutions?

- How can you verify that these solutions work for both equations in the system?

The solution(s) to a quadratic & linear system are the point(s) of intersection.

Example 3: $\begin{cases} y = x^2 - 2x + 4 \\ y = x - 1 \end{cases}$

- No solution since the graphs do not intersect.

- No solutions

- There is no value of x that would make the y-values the same.

You try #1

Go to https://www.desmos.com/calculator and graph the system below. Then find the solution(s) to the system, if any.
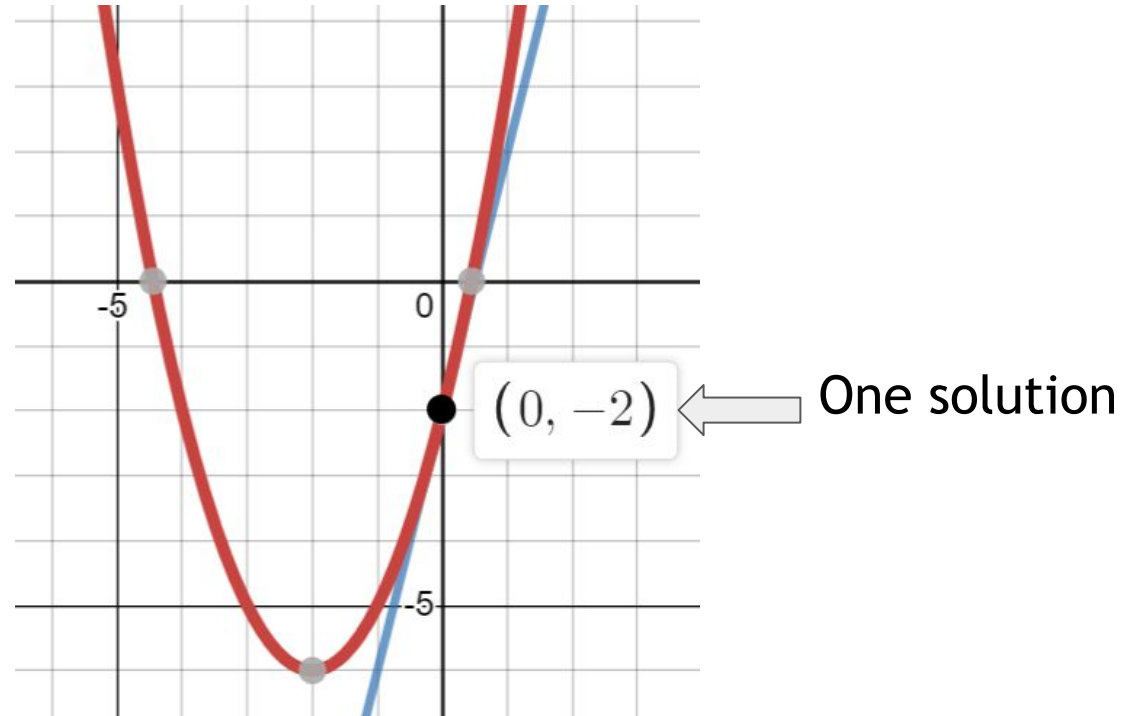
$$\begin{cases} y = (x+2)^2 - 6 \\ y = 4x - 2 \end{cases}$$

Note: Type each equation in a separate row in desmos. Hit the keyboard button in the lower left to bring up the keyboard. You can zoom in or out to help you find the solution(s).

You try #1 - Answer

Go to https://www.desmos.com/calculator and graph the system below. Then find the solution(s) to the system, if any.

$$\begin{cases} y = (x+2)^2 - 6 \\ y = 4x - 2 \end{cases}$$

$(0, -2)$ ⟵ One solution

You try #2

Go to https://www.desmos.com/calculator and graph the system below. Then find the solution(s) to the system, if any.
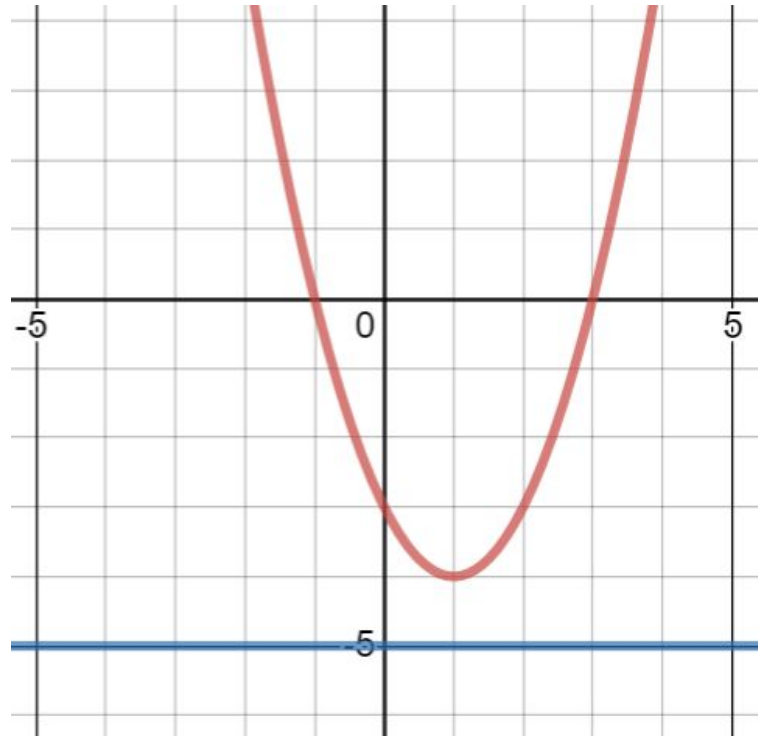
$$\begin{cases} y = x^2 - 2x - 3 \\ y = -5 \end{cases}$$

Note: Type each equation in a separate row in desmos. Hit the keyboard button in the lower left to bring up the keyboard. You can zoom in or out to help you find the solution(s).

You try #2 - Answer

Go to https://www.desmos.com/calculator and graph the system below. Then find the solution(s) to the system, if any.

$$\begin{cases} y = x^2 - 2x - 3 \\ y = -5 \end{cases}$$

No solution

You try #3

Go to https://www.desmos.com/calculator and graph the system below. Then find the solution(s) to the system, if any.
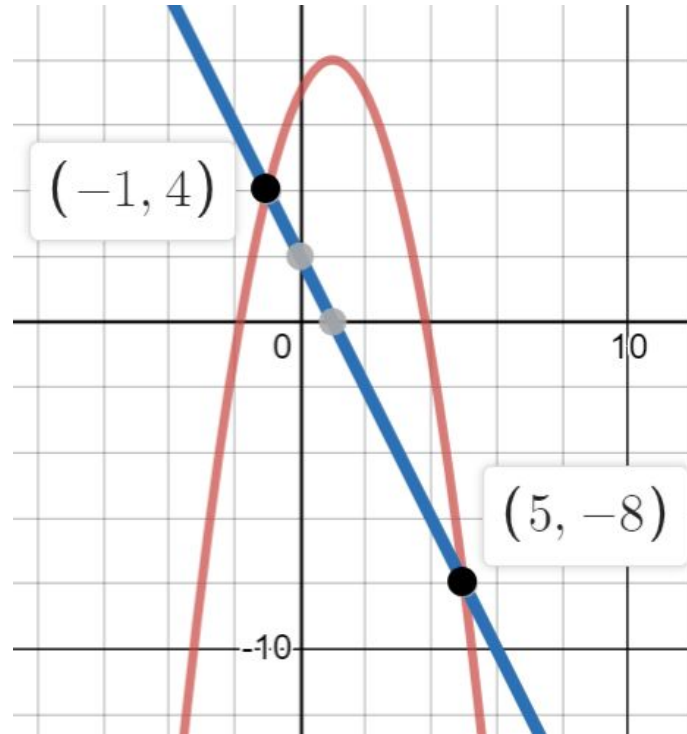
$$\begin{cases} y = -x^2 + 2x + 7 \\ y = -2x + 2 \end{cases}$$

Note: Type each equation in a separate row in desmos. Hit the keyboard button in the lower left to bring up the keyboard. You can zoom in or out to help you find the solution(s).

You try #3 - Answer

Go to https://www.desmos.com/calculator and graph the system below. Then find the solution(s) to the system, if any.

$$\begin{cases} y = -x^2 + 2x + 7 \\ y = -2x + 2 \end{cases}$$

$(-1, 4)$
$(5, -8)$

Two solutions
(-1,4) and (5,-8)

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Find the solution(s) of the following system of equations.

1.) $\begin{cases} y = x^2 + 2x - 3 \\ y = 2x + 1 \end{cases}$

2.) $\begin{cases} y = -x^2 - 6x - 6 \\ y = 3 \end{cases}$

3.) $\begin{cases} y = -(x-2)^2 + 5 \\ y = -x + 1 \end{cases}$

4.) $\begin{cases} y = x^2 - 4x + 2 \\ y = -\dfrac{3}{4}x - 1 \end{cases}$

For the Quadratic Function find the:
- **A) Solution(s)**
- **B) Vertex**
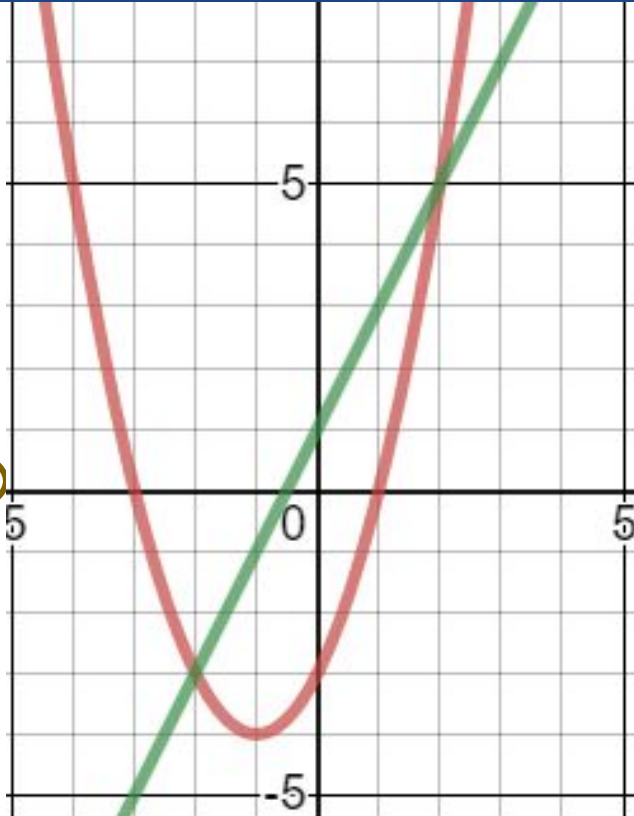- **C) Axis of Symmetry Equation**

For the Linear Function find the:
- **A) x - intercept**
- **B) y - intercept**
- **C) Rate of Change**

1.) $\begin{cases} y = x^2 + 2x - 3 \\ y = 2x + 1 \end{cases}$

System of Equations Solution(s):

(-2, -3) and (2, 5)

For the Quadratic Function find the:
   A)   x = -3 and x = 1
   B)   (-1, -4) -- Minimum
   C)   x = -1

For the Linear Function find the:
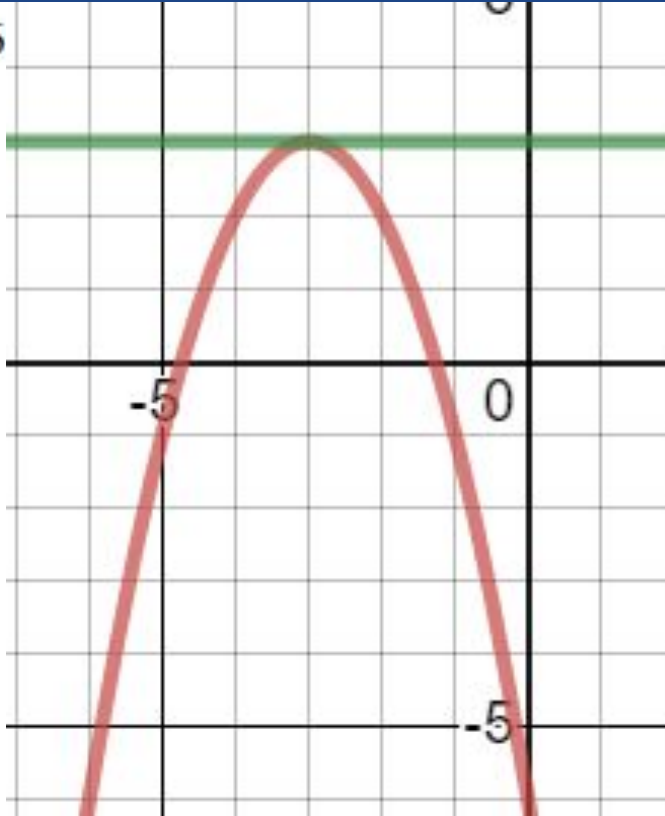   A)   (-0.5, 0)
   B)   (0, 1); b = 1
   C)   m = 2

2.) $\begin{cases} y = -x^2 - 6x - 6 \\ y = 3 \end{cases}$

For the Quadratic Function find the:
- **A) x = -4.732 and x = -1.268**
- **B) (-3, 3) -- Maximum**
- **C) x = -3**
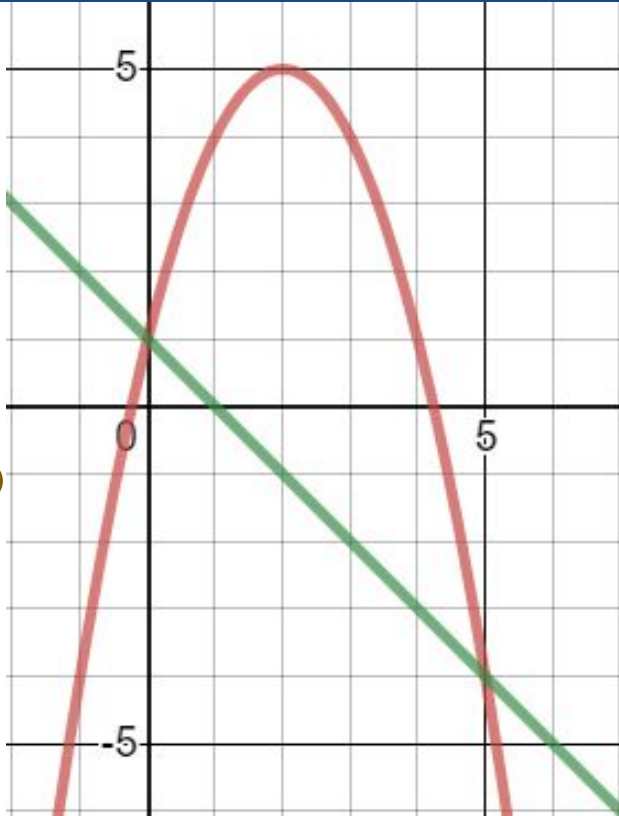
For the Linear Function find the:
- **A) None**
- **B) (0, 3); b = 3**
- **C) m = 0**

System of Equations Solution(s):

(-3, 3)

3.) $\begin{cases} y = -(x-2)^2 + 5 \\ y = -x + 1 \end{cases}$

System of Equations Solution(s):

(0, 1) and (5, -4)

For the Quadratic Function find the:
   A)   **x = -0.236 and x = 4.236**
   B)   **(2, 5) -- Maximum**
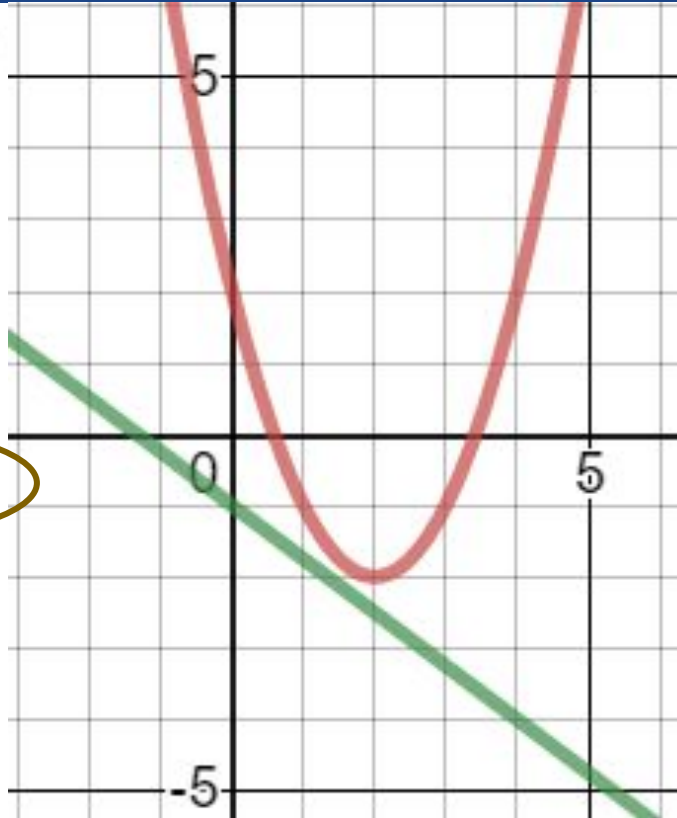   C)   **x = 2**

For the Linear Function find the:
   A)   **(1, 0)**
   B)   **(0, 1); b = 1**
   C)   **m = -1**

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4.) $\begin{cases} y = x^2 - 4x + 2 \\ y = -\dfrac{3}{4}x - 1 \end{cases}$

System of Equations Solution(s):

NO SOLUTION

For the Quadratic Function find the:
- **A)** x = 0.586 and x = 3.414
- **B)** (2, -2) -- Minimum
- **C)** x = 2

For the Linear Function find the:
- **A)** (-1.<u>3</u>, 0) or (-4/3, 0)
- **B)** (0, -1); b = -1
- **C)** m = -3/4

Additional Practice:
Click on the links below to get additional practice and to check your understanding!

Extra Practice for solving systems of equations by graphing.
*Key