

## Lesson 4.2.2: Using Graphs to Solve Quadratic Equations

### Targets:

1. I understand how graphs can represent the solution to a quadratic equation.
2. I understand what the solution to a quadratic equation looks like on a graph.

### Warm Up:

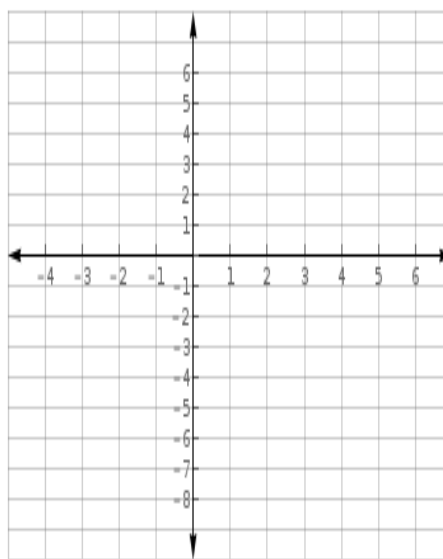
- a. Solve this equation by factoring and using the Zero-Product Property

$$x^2 - 2x - 8 = 0$$

- b. Graph this function and identify the x-intercepts.

$$f(x) = x^2 - 2x - 8$$

- c. What do you notice about the answer to the equation in part a and the x-intercepts in part b?



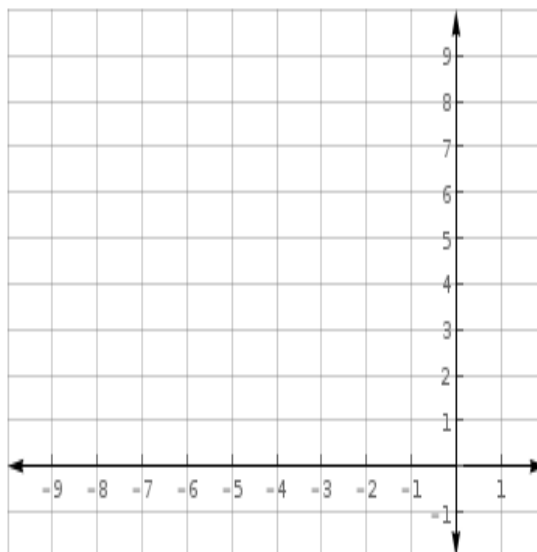
### Practice 1

1. Solve this equation by factoring:

$$x^2 + 4x + 4 = 0$$

2. Now solve the same equation using a graph. Make sure to show where the solution is on the graph.

3. How many solutions does this equation have?
4. Why is the solution to the equation represented by the x-intercepts?



## Practice 2

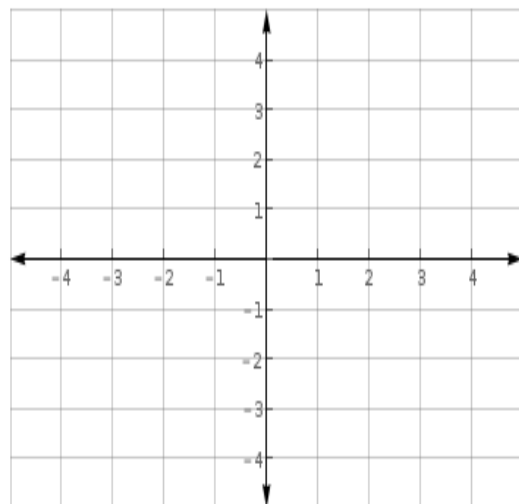
1. Solve this equation by factoring:

$$-2x^2 - 8x - 4 = 2$$

2. Graph the function  $f(x) = -2x^2 - 8x - 4$

then graph the function  $g(x) = 2$

3. How many solutions does this equation have?
4. Why isn't the solution represented by the x-intercept in this situation?
5. What would you have to do to make the solution be represented by the x-intercepts?



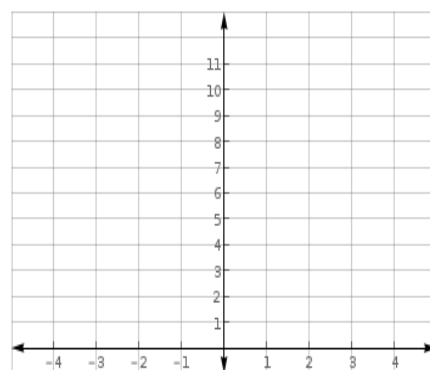
## Practice 3

1. Can this equation be solved by factoring?

$$x^2 + 2x + 3 = 0$$

2. Graph the function  $f(x) = x^2 + 2x + 3$ .

3. How many solutions does this equation have?
4. Explain how you know the answer to question 3.



## Exit Ticket

1. Explain how you can use a graph to solve quadratic equations.
2. Explain how a graph can help you know if there is 1 solution, 2 solutions, or no solutions.

2. Solve each of the following equations by graphing:

a.  $x^2 - 11x + 19 = -5$

b.  $7x^2 - 14x = -7$

c.  $2x^2 + 8x + 11 = 0$

