## Lesson 4: Solving Quadratic Equations with the Zero Product Property

* Let’s find solutions to equations that contain products that equal zero.

### 4.1: Math Talk: Solve These Equations

What values of the variables make each equation true?

### 4.2: Take the Zero Product Property Out for a Spin

For each equation, find its solution or solutions. Be prepared to explain your reasoning.

#### Are you ready for more?

1. Use factors of 48 to find as many solutions as you can to the equation .
2. Once you think you have all the solutions, explain why these must be the only solutions.

### 4.3: Revisiting a Projectile

We have seen quadratic functions modeling the height of a projectile as a function of time.

Here are two ways to define the same function that approximates the height of a projectile in meters,  seconds after launch:

1. Which way of defining the function allows us to use the zero product property to find out when the height of the object is 0 meters?
2. Without graphing, determine at what time the height of the object is 0 meters. Show your reasoning.

### Lesson 4 Summary

The **zero product property** says that if the product of two numbers is 0, then one of the numbers must be 0. In other words, if then either or . This property is handy when an equation we want to solve states that the product of two factors is 0.

Suppose we want to solve . This equation says that the product of and is 0. For this to be true, either or , so both 0 and -9 are solutions.

Here is another equation: . The equation says the product of and is 0, so we can use the zero product property to help us find the values of . For the equation to be true, one of the factors must be 0.

* For to be true, would have to be 2.345.
* For or to be true, would have to be or .

The solutions are 2.345 and .

In general, when a quadratic expression in factored form is on one side of an equation and 0 is on the other side, we can use the zero product property to find its solutions.



© CC BY 2019 by Illustrative Mathematics®