

Algebra 2
Unit: Exponential and Logarithmic Functions
Section: Solving Exponential and Logarithmic Equations

Tutorial: Solving Exponential Equations

Screen 1

In this tutorial we will work through how logarithms are used to solve exponential functions.

Screen 2

The first step is to check if the bases of an exponential equation are the same or can be manipulated to be the same.

Solve three to the x power is equal to nine. At first glance the bases are three and nine and are not the same. Upon closer inspection you can change nine into three squared. You can then rewrite your equation as three to the x power is equal to three squared. Since both the bases are equal the exponents must be equal. This means x is equal to two.

You must always check your work. Three squared is equal to nine so the answer is correct.

Screen 3

What if the bases are not the same?

Look at the example two to the x power is equal to fifty.

Take the logarithm of both sides of the equation.

\log of two to the x power is equal to \log of fifty.

Use the power property of logarithms to move the x in front of \log of two.

Divide both sides by \log of two to solve for x .

x is equal to \log of fifty divided by \log of two.

x is equal to five point six four three eight five six one nine.

This number is too cumbersome so round your answer to the nearest hundredth. x is approximately five point six four.

Screen 4

Now you try. Solve each of the following problems. Click on solution to check your work.

1. Solve x to the fourth power equals 1 sixty-fourth

Solution: x equals negative 3

2. Solve 5 to the x power equals 145.

Solution: x is approximately equal to 3.09

Screen 5

Let's go through the steps to solving exponential functions.

Number one. Check to see if the bases are the same or if they can be manipulated to be the same.

Number two. If the bases are the same then the exponents must be equal.

Number three. If the bases are not the same use the logarithms to solve the equation.