Algebra 2
Unit: Radical Functions
Section: Solving Radical Equations and Inequalities

Tutorial: Solving Radical Equations Algebraically

Screen 1

In this tutorial we will work through the steps for solving radical equations. The following are the steps that we are going to follow to solve these types of equations.

Number one. Isolate the radical on one side of the equation.
Number two. Square, cube, etc. both sides of the equation (note that this may have to happen more than once).
Number three. Simplify and solve the equation.
Number four. Check your work.

Screen 2

Step one. Isolate the radical.

Let's work through an example to better understand the steps to solving radical equations. Suppose you want to solve square root of the quantity eight times n minus five minus one is equal to two for n. The first step is to isolate the radical on one side of the equation.

Square root of the quantity eight times n minus five minus one is equal to two.
Square root of the quantity eight times n minus five minus one plus one is equal to two plus one.
Square root of the quantity eight times n minus five is equal to three.

We are now ready for step two.

Screen 3

Step two. Square both sides of the equation.

Since we are working with a square root we will need to square both sides of the equation.

It is important to remember that if we were working with a cube root we would have to cube both sides of the equation. If we were working with a fourth root we would have to raise each side of the equation to the 4th power and so on.

Square root of the quantity eight times n minus five is equal to three.
Square root of the quantity eight times n minus five quantity squared is equal to three squared.
Eight times n minus five is equal to nine.

Now we are ready for step three.

Screen 4

Step three. Solve the equation.

We are ready to solve the equation for n.

Eight times n minus five is equal to nine.
Eight times n minus five plus five is equal to nine plus five.
Eight times n is equal to fourteen.

n is equal to fourteen eighths which reduces to seven fourths.

We have one final and very important step.

Screen 5

Step four. Check your work.

It is very important that you always check your work. Some of the solutions that you calculate may not work in the original equation. Do not miss this step while working with radical equations.

Square root of the quantity eight times n minus five minus 1 is equal to two.
Square root of the quantity eight times seven-fourths minus five minus one is equal to two.
Square root of the quantity fourteen minus five minus one is equal to two.
Square root of nine minus one is equal to two.
Three minus one is equal to two
Two is equal to two.

Our answer works in our original equation and is the solution.

Screen 6

Now you try.

Work through the following problems. Click on solution to check your work.

Problem one is the quantity x plus eight equals five.

Solution: 17

Problem two is the fourth root of 3t, minus two equals zero.

Hint: Since this is a fourth root you will need to raise each side of the equation to the 4th power.

Solution: Sixteen thirds

Screen 7

Remember.

Follow the following steps when solving radical equations.

Number one. Isolate the radical on one side of the equation.
Number two. Square, cube, etc. both sides of the equation (note that this may have to happen more than once).
Number three. Simplify and solve the equation.
Number four. Check your work.