Algebra 2 - Unit 2: Solving Equations

U2 Lesson 1: One Step Equations

- Day 1 Operations: + / - / * / ÷
- Day 2 Types: Radicals and Exponents
- Day 3 Types: Exponentials and Logarithms

Refresher: Solve the equations.

$-6 = -7 + x$

$+7 \quad +7$

$1 = x$

$\frac{x}{5} = 7$ · 5

$\frac{5}{1}$

$x = 35$

We have already had lessons over identifying radical equations, today we will be solving one-step radical equations.

New Algebraic Rule: You are allowed to raise both sides of an equation to any power you want.

Ex: You could take this equation and cube both sides.

$$x = 2$$

$$x^3 = 8$$

More Inverse Operations:

Exponents / Radicals

Radical Equations are solved by raising both sides to a power that will cancel the root.

$$\sqrt[3]{x} = 2$$

$$x = 2^3 = 8$$

This is a cube root. Cubing both sides will cancel the root.

That was a cube root, but there are tons of other roots and there is no limit to them! Any time you want to cancel a root, just raise both sides to the same power as the root!

Ex: Solve $\sqrt[5]{x} = 2$

$$x = 2^5$$

$$= 32$$

Last Radical example:

Solve: $\left(\sqrt[2]{x}\right)^2 = (7)^2$ $x = 49$

- Reminder: That is a square root. There is an understood 2 up by the radical.

Exponent Equations:

These are when you have a single x raised to some power. The way to get rid of the power is to raise both sides to the same root.

New Algebra Rule: You are allowed to take the root (any number of root) of each side of the equation. (There are some limitations but we will get to them later)

Ex: $\sqrt[3]{x^3} = \sqrt[3]{27}$

$x = 3$

Ex: $\sqrt[5]{x^5} = \sqrt[5]{40}$

$x = \sqrt[5]{40}$

Reminder: You can use your calculator to evaluate these radicals by pressing Math, then scrolling down to the 5th option. When giving your answer, do NOT approximate. Either leave it as a radical or give a terminating number if it simplifies to one.

Example: Solve $\sqrt[4]{x^4} = \pm\sqrt[4]{16}$

Something extra to note. Any time you take an EVEN root to cancel a radical, you need to include a +/- on the other side.

$x = \pm\sqrt[4]{16}$

$x = \pm 2$

$x = 2$

$x = -2$

Ex: Solve $\sqrt[6]{x^6} = \pm\sqrt[6]{81}$

$x = \pm\sqrt[6]{81}$

Special Case: When there are no solutions.

Ex: Solve $x^4 = -16$

This is asking "What number times itself 4 times gives -16". Do you see an issue with this?

(Any positive #)^4 = Positive

(Any negative #)^4 = Positive

No Real solutions

No way to get -16

It is not possible to raise a number to an even power and get a negative number. Think about any positive number times itself an even number of times. Then think about any negative number times itself an even number of times. What kind of answers do you always get?

You CAN get negative numbers by raising numbers to ODD powers. Here's an Example.

$\sqrt[3]{x^3} = \sqrt[3]{-8}$

$x = -2$

Homework:

Unit 2 Lesson 1 Day 2 Worksheet