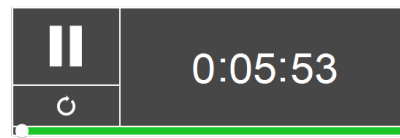


Monday 2/24/20

1. Grab Notes/Calculator, begin warm-up
2. Unit 4 Test 2 Discussion (after warm-up)
3. Solving Radical Notes, Practice



S.W.B.A.T. get the radical by itself and use substitution...

I.O.T. solve radical equations and find extraneous solutions.

Topic: Solving Radical Equations

Name: _____

What am I learning today?

Date: _____

Warm-Up

Solve each of the following equations:

1. $3x + 5 = 17$

$$\begin{array}{r} -5 \\ 3x + 5 = 17 \\ \hline 3x = 12 \\ \hline x = 4 \end{array}$$

2. $4x + 1 = 2x - 3$

$$\begin{array}{r} -1 \\ 4x + 1 = 2x - 3 \\ \hline 4x = 2x - 4 \\ -2x \quad -2x \\ \hline 2x = -4 \\ \hline x = -2 \end{array}$$

3. $\frac{x}{7} = 5$

$$\begin{array}{l} \textcircled{1} x = 5(7) \\ x = 35 \\ \cancel{x = 5} \quad x = 35 \end{array}$$

4. $(x + 7)(x - 4) = 0$

$$\begin{array}{l} x + 7 = 0 \quad x - 4 = 0 \\ x = -7 \quad x = 4 \end{array}$$

5. $x^2 - 11x + 30 = 0$

$$\begin{array}{l} (x - 6)(x - 5) = 0 \\ x - 6 = 0 \quad x - 5 = 0 \\ x = 6 \quad x = 5 \end{array}$$

Vocabulary

An **extraneous solution** is a solution that, when substituted back into the **ORIGINAL EQUATION** does not give a correct answer.

Extraneous Solution

For example:

If you solve the following equation, $2x - 1 = \sqrt{8 - x}$ you get $x = -1$ & $x = \frac{7}{4}$. Is $x = -1$ an extraneous solution?

$$\begin{array}{l} 2(-1) - 1 = \sqrt{8 - (-1)} \\ -3 = 3 \end{array}$$

$x = -1$ is extraneous

Steps for Solving

Use the following steps to solve radical equations:

1. Get the radical by itself.
2. **Square** or **cube** both sides (the whole side).
3. Solve for your variable (get the variable by itself).
4. Check your solution(s) by plugging into the original problem. (a.k.a. CHECK FOR **EXTRANEUS SOLUTIONS**)

$$\begin{array}{l} (\sqrt{\quad})^2 \\ (3\sqrt{\quad})^3 \end{array}$$

Examples

Solve the following radical equations, be sure to check for extraneous solutions.

1. $(\sqrt{v - 4})^2 = 3^2$

$$\begin{array}{l} v - 4 = 9 \\ v = 13 \end{array}$$

CHECK:

$$\begin{array}{l} \sqrt{13 - 4} = 3 \\ \sqrt{9} = 3 \\ 3 = 3 \end{array}$$

2. $18 + 3\sqrt{5a + 5} = 3$

$$\begin{array}{l} -18 \\ 3\sqrt{5a + 5} = -15 \\ \sqrt{5a + 5} = -5 \\ (5a + 5) = (-5)^2 \\ 5a + 5 = 25 \\ 5a = 20 \\ a = 4 \end{array}$$

CHECK:

$$\begin{array}{l} 18 + 3\sqrt{5(4) + 5} = 3 \\ 33 = 3 \end{array}$$

$a = 4$ is extraneous

Topic: Solving Radical Equations

Date: _____

Examples
Cont'd.

$$3(\sqrt[3]{2n-88}) = \sqrt[3]{\frac{n}{6}}$$

$$6(2n-88) = \frac{n}{6}$$

$$12n - 528 = n$$

$$\frac{12n}{n} - \frac{528}{n} = \frac{n}{n}$$

$$11n - 528 = 0$$

$$11n = 528$$

$$n = 48$$

CHECK:

$$\sqrt[3]{2(48)-88} = \sqrt[3]{\frac{48}{6}}$$

$$\sqrt[3]{16-88} = \sqrt[3]{8}$$

$$\sqrt[3]{-72} = \sqrt[3]{8}$$

$$-2 = 2$$

no extraneous solutions

4. $\sqrt{x+7} + 5 = x$

$$(\sqrt{x+7})^2 = (x-5)^2$$

$$x+7 = (x-5)(x-5)$$

$$x+7 = x^2 - 10x + 25$$

$$0 = x^2 - 11x + 18$$

$$0 = (x-2)(x-9)$$

$$x = 2, x = 9$$

↑
extraneous.

CHECK:

$$x = 2$$

$$\sqrt{2+7} + 5 = 2$$

$$8 = 2$$

×

$$x = 9$$

$$\sqrt{9+7} + 5 = 9$$

$$9 = 9$$

✓

You Try

Solve the following radical equations. Be sure to check for extraneous solutions.

1. $(\sqrt{2x+8})^2 = 12^2$

$$12(\sqrt{2x+8}) = 12$$

$$12(68) + 8 = 12 - 8 - 8$$

$$12 = -12$$

$$\frac{2x}{2} = \frac{136}{2}$$

$$x = 68$$

It is extran.

$$\sqrt{11} = 9$$

$$\sqrt{2} \checkmark$$

$$\sqrt{9-7}$$

$$\sqrt{2} \checkmark$$

3. $(\sqrt{11-x})^2 = (\sqrt{x-7})^2$

$$11-x = x-7$$

$$11-2x = -7$$

$$-2x = -18$$

$$x = 9$$

2. $4\sqrt[3]{V+3} - 1 = 7$

$$4\sqrt[3]{V+3} = 8$$

$$\frac{4\sqrt[3]{V+3}}{4} = \frac{8}{4}$$

$$(\sqrt[3]{V+3})^3 = (2)^3$$

$$V+3 = 8$$

$$V = 5$$

4. $14 + 2\sqrt{x-1} = 2x$

$$2\sqrt{x-1} = 2x - 14$$

$$\frac{2\sqrt{x-1}}{2} = \frac{2x-14}{2}$$

$$(\sqrt{x-1})^2 = (x-7)(x-7)$$

$$x-1 = x^2 - 14x + 49$$

$$0 = x^2 - 15x + 50$$

$$0 = (x-5)(x-10)$$

$$x-5 = 0$$

$$x-10 = 0$$

$$x = 5$$

$$x = 10$$

↓
extraneous

Summary

Summarize the lesson in your own words