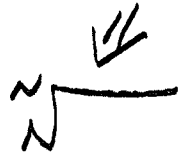


Algebra 2 | Monday 4-15-13 | Class Notes

Ch. 5-8 Solving Radical Equations and Inequalities

* radical equation AN EQUATION WITH a VARIABLE under a radical

* OF RATIONAL EXPONENTS
(Ex) $x^{\frac{1}{n}}$



Recall $\sqrt[n]{x} \Rightarrow$ Nth root of x
N is the index of the radical. If it is missing, it is assumed to be 2 i.e., a "square" root

Steps to solve
A radical equation

① get the radical "by itself" using GRE

② raise both sides of equation by the power of the index to get variable out of radical.

* There may be false AKA 'EXTRANEUS' solutions

* ③ Do checks!

You may not be able to get the radical by itself - undo it but be careful to undo it correctly.

$$\begin{array}{l}
 \textcircled{\text{EX}} \quad 2\sqrt{x+1} = 14 \\
 \quad \quad \sqrt{x+1} = 7 \\
 \quad \quad x+1 = 49 \\
 \quad \quad \boxed{x = 48}
 \end{array}
 \quad \left| \quad \begin{array}{l}
 \text{CK} \quad 2\sqrt{48+1} \stackrel{?}{=} 14 \\
 \quad \quad 2(7) \stackrel{?}{=} 14 \checkmark
 \end{array}
 \right.$$

$$\begin{array}{l}
 \textcircled{\text{EX}} \quad \sqrt{35x} = 5\sqrt{x+2} \\
 \quad \quad 35x = 25(x+2) \\
 \quad \quad 35x = 25x + 50 \\
 \quad \quad 10x = 50 \\
 \quad \quad \boxed{x = 5}
 \end{array}$$

$$\begin{array}{l}
 \text{CK} \quad \sqrt{35(5)} \stackrel{?}{=} 5\sqrt{5+2} \\
 \quad \quad \sqrt{175} \stackrel{?}{=} 5\sqrt{7} \\
 \quad \quad \overset{!}{25 \cdot 7} \stackrel{?}{=} 5\sqrt{7} \\
 \quad \quad \sqrt{25 \cdot 7} \stackrel{?}{=} 5\sqrt{7} \\
 \quad \quad 5\sqrt{7} = 5\sqrt{7} \checkmark
 \end{array}$$

$$\textcircled{2X} \quad -1713 = -5N^{\frac{2}{3}} + 2$$

$$\frac{-1715}{-5} = N^{\frac{2}{3}}$$

$$(343)^{\frac{2}{3}} = (N^{\frac{2}{3}})^{\frac{2}{3}}$$

$$(\sqrt[3]{343})^2 = N$$

$$\begin{array}{r} 49 \\ \times 7 \\ \hline 343 \end{array}$$

$$(7)^2 = N$$

$$N = 49$$

$$\underline{\underline{CK}} \quad -1713 \stackrel{?}{=} -5(49)^{\frac{2}{3}} + 2$$

$$-1713 \stackrel{?}{=} -5(343)^{\frac{1}{3}} + 2$$

$$-1713 \stackrel{?}{=} -1715 + 2 \quad \checkmark$$

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$$-9 = -1 - 2p^{\frac{1}{2}}$$

$$\frac{-8}{-2} = \frac{-2p^{\frac{1}{2}}}{-2}$$

$$(4)^{\frac{1}{2}} = (p^{\frac{1}{2}})^{\frac{1}{2}}$$

$$16 = p$$

CK ?
 $-9 = -1 - 2(16)^{\frac{1}{2}}$
 $-9 = -1 - 8 \checkmark$

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$$2916 = 4x^{\frac{3}{2}}$$

$$\frac{2916}{4} = x^{\frac{3}{2}}$$

$$(729)^{\frac{2}{3}} = (x^{\frac{3}{2}})^{\frac{2}{3}}$$

$$(\sqrt[3]{729})^2 = x$$

$$(9)^2 = x$$

$$81 = x$$

CK ?
 $2916 = 4(81)^{\frac{3}{2}}$
 $2916 = 4(9)^3$
 $2916 = 4(729)$
 $2916 = 2916 \checkmark$

$$81^{\frac{3}{2}} = \left(\sqrt[2]{81} \right)^3 = (9)^3 = 729$$

$$\begin{aligned} 81^{\frac{3}{2}} &= \sqrt[2]{81^3} = \sqrt[2]{81 \cdot 81 \cdot 81} \\ &= \sqrt[2]{81} \cdot \sqrt[2]{81} \cdot \sqrt[2]{81} \\ &= \left(\sqrt[2]{81} \right)^3. \end{aligned}$$

$$a^{\frac{m}{n}} = \left(\sqrt[n]{a} \right)^m \text{ or } \sqrt[n]{a^m}$$

FER
