

Beginning & Intermediate
Algebra

10.6—Solving Radical Equations

Nov 23-12:06 PM

Review

$(\sqrt{a})^2$	$(3\sqrt{x})^2$	$(\sqrt{x+1})^2$
a	9x	x+1

Nov 23-12:06 PM

What is a **RADICAL EQUATION**?

$(\sqrt{3y-2})^2 = 5^2$ $3y-2 = 25$ $\begin{array}{r} +2 \quad +2 \\ \hline 3y = 27 \\ y = 9 \end{array}$	$\sqrt{3(9)-2} = 5$ $\sqrt{27-2} = 5$ $\sqrt{25} = 5$
---	---

Nov 23-12:06 PM

Example

$$(\sqrt[3]{k+2})^3 = 4^3$$

$$k+2 = 64$$

Nov 23-12:06 PM

Steps for **SOLVING** a Radical Equation

ISOLATE the radical.

Apply the Power Rule:
RAISE BOTH SIDES OF THE EQUATION TO THE SAME POWER TO GET RID OF THE ROOT.

Solve the resulting **EQUATION**.

ALWAYS check your **SOLUTIONS!!**

Nov 23-12:06 PM

Example

$\sqrt{r-5} + 6 = 10$ $\begin{array}{r} -6 \quad -6 \\ \hline (\sqrt{r-5})^2 = 4^2 \end{array}$ $r-5 = 16$ $r = 21$	$\sqrt{21-5} + 6 = 10$
---	------------------------

Nov 23-12:06 PM

Example

$$\sqrt{c+3} + 7 = 1$$

$$\sqrt{33+3} + 7 = 1$$

$$6 + 7 = 1$$

$$13 = 1$$

$$\sqrt{c+3} = -6$$

$$c+3 = 36$$

$$c = 33$$

\emptyset

Nov 23-12:06 PM

Example

$$(\sqrt{3x-4})^2 = (\sqrt{5x+2})^2$$

$$3x-4 = 5x+2$$

$$-3x-2 = -3x-2$$

$$-6 = 2x$$

$$x = -3$$

$$\sqrt{3(-3)-4} = \sqrt{5(-3)+2}$$

$$\sqrt{-13} = \sqrt{-13}$$

$$\sqrt{13} = \sqrt{13}$$

Nov 23-12:06 PM

Example

$$(3+x)^2 = (\sqrt{7+3x})^2$$

$$x = -2, -1$$

$$(3+x)(3+x) = 7+3x$$

$$9+3x+3x+x^2 = 7+3x$$

$$x^2+6x+9 = 7+3x$$

$$x^2+3x+2 = 0$$

$$(x+2)(x+1) = 0$$

Nov 23-12:06 PM

You Try...

$$\sqrt{4y+1} + 5 = y$$

$$(\sqrt{4y+1})^2 = (y-5)^2$$

$$4y+1 = y^2 - 10y + 25$$

$$y^2 - 14y + 24 = 0$$

$$(y-2)(y-12) = 0$$

$$y = 12$$

Nov 23-12:06 PM

Example

$$\sqrt{x+5} - \sqrt{x} = 1$$

$$(\sqrt{x+5})^2 = (1 + \sqrt{x})^2$$

$$x+5 = 1 + 2\sqrt{x} + x$$

$$4 = 2\sqrt{x}$$

$$16 = 4x$$

$$x = 4$$

Nov 23-12:06 PM

#24

$$\frac{(9+3i)(6+9i)}{(6-9i)(6+9i)} = \frac{54+81i+18i+27i^2}{54+99i-27}$$

$$= \frac{27+99i}{27}$$

$$= \frac{3}{1} + \frac{11}{3}i$$

May 19-12:43 PM

$$i^2 + i$$

$$-1 + i$$

#9

$$\frac{\sqrt{3}}{3\sqrt{5}-\sqrt{3}} \cdot \frac{(3\sqrt{5}+\sqrt{3})}{(3\sqrt{5}+\sqrt{3})}$$

$$\frac{3\sqrt{15} + 3}{42}$$

$$\frac{\sqrt{15} + 1}{14}$$

$$(3\sqrt{5})^2 - (\sqrt{3})^2$$

$$45 - 3$$

$$42$$

May 19-12:47 PM

$$\sqrt{\frac{75x^3}{y^5}}$$

$$\frac{\sqrt{75x^3}}{\sqrt{y^5}}$$

$$\frac{5\sqrt{3x} \cdot \sqrt{y}}{y^2 \sqrt{y}}$$

$$\frac{5\sqrt{3xy}}{y^3}$$

May 19-12:50 PM

$$8\sqrt[3]{108} + 10\sqrt[3]{48} + 9\sqrt[3]{27}$$

$$4\sqrt[3]{3} + 10\sqrt[3]{3} + 3\sqrt[3]{3}$$

May 19-12:53 PM

$$4k^3 \sqrt[3]{3x}$$

May 19-12:54 PM

$$\frac{y^{9/8}}{y^{5/8}}$$

$$y^{4/8} \quad y^{1/2} = \sqrt{y}$$

$$f(x) = \sqrt{\quad}$$

$$\quad \geq 0$$

$$6 \leq x$$

$$x \geq 6$$

$$[6, \infty)$$

May 19-12:56 PM