

Solving Radical Equations



What are we looking to accomplish?

~We want to be able to solve radical equations.

Feb 6-8:02 AM

Feb 6-8:07 AM

Some Basic Steps

Solving Radical Equations	
Steps	Example
1. Isolate the radical.	$\sqrt{x} - 2 = 0$ $\sqrt{x} = 2$
2. Raise both sides of the equation to the power equal to the index of the radical.	$(\sqrt{x})^2 = (2)^2$
3. Simplify and solve.	$x = 8$

Examples:

1) $5 + \sqrt{x+1} = 16$

$$\begin{aligned} \sqrt{x+1} &= 11 \\ x+1 &= 121 \\ x &= 120 \end{aligned}$$

$5 + \sqrt{120+1} = 16 \checkmark$

2) $7\sqrt[3]{5x-7} = 84$

$$\begin{aligned} \sqrt[3]{5x-7} &= 12 \\ 5x-7 &= 1728 \\ 5x &= 1735 \\ x &= 347 \end{aligned}$$

You're Turn

1) $4 + \sqrt{x-1} = 5$

$$\begin{aligned} \sqrt{x-1} &= 1 \\ x-1 &= 1 \\ x &= 2 \end{aligned}$$

2) $6\sqrt{x+10} = 42$

Feb 6-8:08 AM

Feb 6-8:10 AM

More examples!

a) $\sqrt{7x+2} = 3\sqrt{3x-2}$

$$\begin{aligned} 7x+2 &= 9(3x-2) \\ 7x+2 &= 27x-18 \\ 20 &= 20x \\ x &= 1 \end{aligned}$$

b) $\sqrt{-3x+33} = 5-x$

$$\begin{aligned} -3x+33 &= (5-x)^2 \\ -3x+33 &= 25-5x-5x+x^2 \\ -3x+33 &= x^2-10x+25 \\ +3x-33 &+3x-33 \\ 0 &= x^2-7x-8 \\ (x-8)(x+1) & \\ x &= 8, x = -1 \end{aligned}$$

You too!

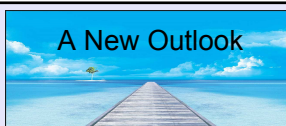
c) $\sqrt[3]{x+6} = 2\sqrt{x-1}$

$$\begin{aligned} x+6 &= 8(x-1)\sqrt{x-1} \\ x+6 &= 8x-8\sqrt{x-1} \\ -x+8 &= -8\sqrt{x-1} \\ \frac{14}{8} &= \sqrt{x-1} \\ \frac{7}{4} &= \sqrt{x-1} \end{aligned}$$

d) $\sqrt{2x+14} = x+3$

Feb 6-8:11 AM

Feb 6-8:14 AM



We need to solve...

$$(5x + 7)^{\frac{1}{3}} = 3$$

Hint: Raise to the power of the reciprocal of the exponent

$$(5x+7)^1 = 27$$

$$5x+7=27$$

$$5x=20$$

$$x=4$$

Feb 6-8:16 AM

Another One!

$$(2x)^2 = (4x + 8)^{\frac{1}{2}}$$

$$4x^2 = 4x + 8$$

$$-4x - 8 \cdot 4x - 8$$

$$\frac{4x^2 - 4x - 8}{4} = 0$$

$$x^2 - x - 2 = 0$$

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

$$x=2 \quad x=-1$$

Feb 6-8:21 AM

On your own!

$$(x + 5)^{\frac{1}{3}} = 3$$

$$(2x + 15)^{\frac{1}{2}} = x$$

Feb 6-8:22 AM