



## Solving Equations Involving Taking Square Roots



★ Like squaring both sides of an equation, you can take the square root of both sides. REMEMBER that there are two roots when you take the square root.

Model Problem:

$$3x^2 = 225$$

$$\frac{3x^2}{3} = \frac{225}{3}$$

$$\sqrt{x^2} = \sqrt{75}$$

$$x = \pm 5\sqrt{3}$$

$$\sqrt{75}$$

$$\wedge$$

$$\sqrt{25 \cdot 3}$$

$$5\sqrt{3}$$

$$\begin{array}{r} 3 \overline{) 75} \\ \underline{525} \\ 25 \\ \underline{25} \\ 0 \end{array}$$

5 ←

$$5\sqrt{3}$$

$$\sqrt{x^2} = \sqrt{9}$$

$$x = \pm 3$$


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$$\sqrt{x^2} = \sqrt{25}$$

$$x = \pm 5$$


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$$\sqrt{x^2} = \sqrt{121}$$

$$x = \pm 11$$



### Model Problem #2:

$$2(x^2 + 4) = 188$$

$$\begin{array}{r|l} 2x^2 + 8 & = 188 \\ -8 & -8 \\ \hline \end{array}$$

$$\frac{2x^2}{2} = \frac{180}{2}$$

$$\sqrt{x^2} = \sqrt{90}$$

$$x = \pm 3\sqrt{10}$$

$$\begin{array}{r} 4 \\ 9 \\ 16 \\ 25 \\ 36 \\ 49 \end{array} \quad \begin{array}{l} \sqrt{90} \\ \uparrow \\ \sqrt{9} \cdot \sqrt{10} \\ 3\sqrt{10} \end{array}$$

$$\begin{array}{r} 2 \overline{) 90} \\ \underline{3 \phantom{0}} \\ 45 \\ \underline{3 \phantom{0}} \\ 15 \\ \underline{5} \\ 0 \end{array}$$

3 ←

$$3\sqrt{2.5}$$

$$3\sqrt{10}$$



### Model Problem #3:

$$10(x^2 + 1) + 5x^2 = 90 + 28 + 3x^2$$

$$\begin{array}{r|l} 10x^2 + 10 + 5x^2 & = 90 + 28 + 3x^2 \\ \hline \end{array}$$

$$\begin{array}{r|l} 15x^2 + 10 & = 118 + 3x^2 \\ -3x^2 & -3x^2 \\ \hline \end{array}$$

$$\begin{array}{r|l} 12x^2 + 10 & = 118 \\ -10 & -10 \\ \hline \end{array}$$

$$\frac{12x^2}{12} = \frac{108}{12}$$

$$\sqrt{x^2} = \sqrt{9}$$

$$x = \pm 3$$

both sides →

↑  
2 answers