

Solving Quadratic Equations Using Square Roots

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1. Get x^2 or $(x+\#)^2$ by itself.
2. Take the square root ($\sqrt{\quad}$) of both sides of the equation.
3. There will ALWAYS be a positive answer and a negative answer.
4. Check your answers!!!

Solve each equation.

1. $x^2 - 4 = 0$

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

$$X = \pm 2$$

or

$$\begin{aligned} X &= 2 \\ X &= -2 \end{aligned}$$

2. $\frac{1}{2}x^2 - 3 = 12$

$$\frac{1}{2}x^2 = 15$$

$$x^2 = 30$$

$$\sqrt{x^2} = \sqrt{30}$$

$$X = \pm 3\sqrt{2}$$

$$\begin{aligned} X &= 3\sqrt{2} \\ X &= -3\sqrt{2} \end{aligned}$$

3. $2x^2 - 338 = 0$

$$\frac{2x^2}{2} = \frac{338}{2}$$

$$\sqrt{x^2} = \sqrt{169}$$

$$X = \pm 13$$

4. $9x^2 = 243$

5. $(x-2)^2 = 81$

$$(x-2) = \pm 9$$

① $x-2 = 9$

$$x = 11$$

② $x-2 = -9$

$$x = -7$$

6. $\frac{3}{5}(x-4)^2 = 125$

$$\sqrt{(x-4)^2} = \sqrt{208.33} \Rightarrow (x-4) = \pm 14.43$$

① $(x-4) = 14.43$

$$x = 18.43$$

② $(x-4) = -14.43$

$$x = -10.43$$

7. $\frac{1}{3}(x+4)^2 - 1 = 5$

~~$\frac{1}{3}(x+4)^2 = 6 \cdot \frac{3}{1}$~~

$$\sqrt{(x+4)^2} = \sqrt{18} \quad (x+4) = \pm 3\sqrt{2}$$

① $x+4 = 3\sqrt{2} - 4$

$$x = 3\sqrt{2} - 4$$

② $x+4 = -3\sqrt{2} - 4$

$$x = -3\sqrt{2} - 4$$

Opposite operations Review:

- * Add / Subtract
- * Multiply / Divide

NEW

- * Square (2) / Square Root ($\sqrt{\quad}$)

[to get rid of a squared, take the square root &
to get rid of a square root, square it]

Ex:

$$x^2 = 4 \Rightarrow \sqrt{x^2} = \sqrt{4} \Rightarrow x = 2$$
$$\sqrt{x} = 8 \Rightarrow \sqrt{x}^2 = 8^2 \Rightarrow x = 64$$

\pm means Plus or Minus

[this means you have positive & negative of that number]

Ex: $\bullet \pm 3 \begin{cases} \rightarrow 3 \\ \rightarrow -3 \end{cases}$ $\bullet \pm 3\sqrt{2} \begin{cases} \rightarrow 3\sqrt{2} \\ \rightarrow -3\sqrt{2} \end{cases}$

$\bullet 4 \pm \sqrt{5} \rightarrow \begin{cases} 4 + \sqrt{5} \\ 4 - \sqrt{5} \end{cases}$

$$x^2 = 16 \downarrow$$
$$x = \pm 4$$

Because,

$$x^2 = 16 \Rightarrow x \cdot x = 16$$

$$\bullet 4 \cdot 4 = 16 \quad \bullet -4 \cdot -4 = 16$$
$$(4)^2 = 16 \quad (-4)^2 = 16$$