Methods to solve a quadratic equation:
1. Factoring Method
2. Square Root Method
3. Quadratic Formula Method

The general form of a quadratic equation is:
$ax^2 + bx + c = 0$, where $a, b,$ and c are real numbers and $a \neq 0$.

The second method, the Square Root Method, can be used on quadratic equations in one of two forms:

1. $\boldsymbol{ax^2 = c}$
2. $\boldsymbol{(px + h)^2 = k}$

Steps to Solve a Quadratic Equation, in the form of $\boldsymbol{ax^2 = k}$, Using the Square Root Method
1. Write out the original problem.

2. Simplify each side of the equation and use the properties of equality to have the x^2 term on the left side and the constant on the right side.

3. Divide each side by the coefficient of the $\mathbf{x^2}$ term so that the problem looks like, $\mathbf{x^2} = 25$.

4. Take the square root of each side and on the right side make sure you add $\pm$ in front of the radical.

5. Simplify the square root on the right side and retain the $\pm$. On the left side, you should end up with ***x***.

6. If the square root term contains a perfect square, simplify and break up problem into:

   x = + *value* or ***x*** = – *value*

7. Check both answers.

8. If the square root remains in the problem, just leave it as:

   $x = \pm\sqrt{}$

Example: Solve $3x^2 = 75$ using the square root method.

Steps to Solve

$3x^2 = 75$

$\frac{3x^2}{3} = \frac{75}{3}$

$x^2 = 25$

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

$x = \pm\ 5$

$x = 5$ or $x = -5$

Steps to Check

Check $3x^2 = 75$ for $x = 5,\ x = -5$

$3(5)^2 \stackrel{?}{=} 75$	$3(-5)^2 \stackrel{?}{=} 75$
$3(25) \stackrel{?}{=} 75$	$3(25) \stackrel{?}{=} 75$
$75 = 75$ *true*	$75 = 75$ *true*

The solution set is $\{\pm 5\}$.

Steps to Solve a Quadratic Equation, in the form of *$(px + h)^2 = k$*, Using the Square Root Method

1. Write out the original problem.

2. Isolate the $(px + h)^2$ expression on left side equal to one constant on right side.

3. Take the square root of each side and on the right side make sure you add $\pm$ in front of the radical.

4. Simplify the square root on the right side and retain the $\pm$.

5. Isolate the ***x*** variable on the left by adding or subtracting the constant on both sides and on the right side place the constant before the $\pm$.

6. If the square root can be simplified to a number, split answer in two parts.

7. If the problem has a square root, such as, $x = 8 \pm \sqrt{5}$, keep the problem with the square root. If the answer is a fraction containing a square root, simplify if possible by factoring.

Example: Solve: $(x + 2)^2 = 12$

$$(x + 2)^2 = 12$$
$$\sqrt{(x + 2)^2} = \pm\sqrt{12}$$
$$x + 2 = \pm\sqrt{(4)(3)}$$
$$x + 2 = \pm\sqrt{(4)}\sqrt{(3)}$$
$$x + 2 = \pm 2\sqrt{3}$$
$$x + 2 - 2 = -2 \pm 2\sqrt{3}$$
$$x = -2 \pm 2\sqrt{3}$$

The solution set is $\{-2 \pm 2\sqrt{3}\}$.