Solving Quadratic Equations
Solving Quadratic Equations

A quadratic equation in one variable is an equation that can be written in the form $ax^2 + bx + c = 0$, where $x$ is the variable.

**Examples:**

\[
3x^2 + 8x + 4 = 0
\]

\[
4x^2 = 100
\]

\[
\frac{x^2}{2} = 18
\]

\[
(x + 2)(x - 6) = 0
\]

**Non-examples:**

\[
3x^3 + 8x + 4 = 0
\]

\[
4^x = 100
\]

\[
\frac{2}{x^2} = 18
\]

\[
(x + 2) + (x - 6) = 0
\]
Example 1  Solve the equation.

\[ x^2 = 64 \]
Example 2  Solve the equation.

\[ x^2 - 144 = 0 \]
Solving Quadratic Equations

\[ x^2 = k \quad \text{means} \quad x = \sqrt{k} \quad \text{or} \quad x = -\sqrt{k} \]

**Example 3** Solve the equation.

\[(x - 2)^2 = 144\]
Example 4 Solve the equation.

\[(3x + 4)^2 = 25\]
Solving Quadratic Equations

\[ x^2 = k \quad \text{means} \quad x = \sqrt{k} \quad \text{or} \quad x = -\sqrt{k} \]

**Example 5** Solve the equation.

\[ 6(8 - x)^2 = 0 \]
Example 6  Solve the equation.

\[
\frac{1}{8}x^2 - 8 = 0
\]
Solving Quadratic Equations
by Factoring
Example 1 Solve the equation.

\[(x + 2)(x - 6) = 0\]
Solving Quadratic Equations by Factoring

If \( a \cdot b = 0 \), then \( a = 0 \) or \( b = 0 \).

**Example 2** Solve the equation.

\[ x^2 - 9x - 10 = 0 \]
Solving Quadratic Equations by Factoring

If $a \cdot b = 0$, then $a = 0$ or $b = 0$.

**Example 3** Solve the equation.

$$x^2 - 10x + 25 = 0$$
Solving Quadratic Equations by Factoring

If \( a \cdot b = 0 \), then \( a = 0 \) or \( b = 0 \).

**Example 4** Solve the equation.

\[ 3x^2 + 8x + 4 = 0 \]
Solving Equations by Factoring
(Advanced)
Solving Equations by Factoring (Advanced)

If \( a \cdot b = 0 \), then \( a = 0 \) or \( b = 0 \).

**Example 1** Solve the equation.

\[ 12x^2 - 40x + 12 = 0 \]
Solving Equations by Factoring (Advanced)

If $a \cdot b = 0$, then $a = 0$ or $b = 0$.

**Example 2** Solve the equation.

$$10 - 10x^2 = 0$$
Solving Equations by Factoring (Advanced)

If $a \cdot b = 0$, then $a = 0$ or $b = 0$.

Example 3  Solve the equation.

$$x^3 - 25x = 0$$
Solving Equations by Factoring (Advanced)

If \( a \cdot b = 0 \), then \( a = 0 \) or \( b = 0 \).

*Example 4* Solve the equation.

\[ 27x^3 = 3x \]