



Math Study Strategies

Quadratic Equations

In a quadratic equation (second degree equation) the variable is raised to the second power.

Quadratic equations can be written in the form:

- ▶ $ax^2 = k$
- ▶ $(x - h)^2 = k$
- ▶ $a(x - h)^2 = k$

The standard form of a quadratic equation is:

$$ax^2 + bx + c = 0$$

or

$$y = ax^2 + bx + c$$

A quadratic equation can be solved by:

- ▶ taking the square root
- ▶ factoring using the zero product principle
- ▶ completing the square
- ▶ using the quadratic formula
- ▶ graphing

Taking the square root

Applicable when the equation is in $ax^2 = k$ form

$$ax^2 = k \quad \rightarrow \quad x^2 = \frac{k}{a} \quad \rightarrow \quad x = \sqrt{\frac{k}{a}} \quad \text{or} \quad x = -\sqrt{\frac{k}{a}}$$

Factoring using the zero product principle

Please refer to the document entitled "Factoring Trinomials" for instructions on factoring a trinomial expression.

Factoring using the zero product principle is only applicable for quadratic trinomials that are factorable.

Follow the steps below:

- 1) Make sure the equation is in standard form: $ax^2 + bx + c = 0$.
- 2) Factor the left side of the equation.
- 3) The zero product principle states that if $ab = 0$, then "a" must be zero or "b" must be zero. For example, if the equation is $(x + 3)(x + 7) = 0$, then $(x + 3) = 0$ or $(x + 7) = 0$
- 4) Solve for x.

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