Solving Quadratic Equations

Summary

1. Quadratic equations are in the form $ax^2 + bx + c = 0$
2. When solving quadratic equations, **always** get the equation equal to 0 first.

Solving Quadratic Equations by Factoring

Previously, we looked at factoring quadratic expressions in the forms

$$x^2 + bx + c \quad \text{and} \quad ax^2 + bx + c$$

After getting the equation equal to 0 (if necessary),
some equations can quickly be solved by factoring.

You will get your equation in the form

$$(\texttt{expression})(\texttt{expression}) = 0$$

Set each `expression` equal to 0 and solve.

Example 1. Solve each.

(a) $x^2 + x - 12 = 0$ (b) $x^2 + 9x + 10 = 2x$ (c) $7x^2 - 7x - 1 = x^2 + 4$

Solving Quadratic Equations That Can't Be Factored

Many quadratic equations can't be solved by factoring.

However, after getting the equation equal to 0, **we can write the other side in vertex form and solve.**

Before that, though, let's take a look at some very basic quadratic equations:

Example 2. Solve each.

(a) $x^2 = 49$ (b) $x^2 = 100$ (c) $(x - 1)^2 = 25$

Example 3. For each of the following,

1. Get the equation equal to 0 (if necessary).
2. Write the other side in vertex form: $a(x-h)^2+k$
3. Solve for x.

(a) $5x^2+3x-21=0$

(b) $8x^2+5x-6=0$

(c) $2x^2+9x-32=-9$

(d) $-x^2+5x-22=-8x^2$