Section 1.5 Quadratic Equations

Definition of a Quadratic Equation

A ***quadratic equation*** in x in an equation that can be written in the general form $ax^2 + bx + c = 0$, where a, b, and c are real numbers, with $a \neq 0$. A quadratic equation in x is also called a second-degree polynomial equation in x.

The Zero-Product Principle

If the product of two algebraic expressions in zero, then at least one of the factors is equal to zero. If $AB = 0$, then $A = 0$ or $B = 0$.

Solving a Quadratic Equation by Factoring

1. If necessary, rewrite the equation in the general form $ax^2 + bx + c = 0$, moving all nonzero terms to one side, thereby obtaining zero on the other side.
2. Factor completely.
3. Apply the zero-product principle, setting each factor containing a variable equal to zero.
4. Solve the equations in step 3.
5. Check the solutions in the original equation.

Example 1: Solve each equation by factoring.