# Chapter 3: Quadratic Equations

3.1 Introduction to Quadratic Equations

A quadratic equation is a second-degree polynomial equation in a single variable x, with the general form:

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

where $a \neq 0$. The solutions can be found using the quadratic formula:

$$x = (-b \pm \sqrt{(b^2 - 4ac)}) / 2a$$

3.2 Solving Methods

There are several methods to solve quadratic equations:

1. Factoring: When the equation can be factored into (x - r■)(x - r■) = 0

2. Quadratic Formula: Always works, especially when factoring is difficult

3. Completing the Square: Useful for deriving the quadratic formula

4. Graphical Method: Finding x-intercepts of the parabola $y = ax^2 + bx + c$

Example: Solve $x^2 - 5x + 6 = 0$
This factors to $(x - 2)(x - 3) = 0$
Therefore, $x = 2$ or $x = 3$