Section 1.4b   Quadratic Equations

Objective 4: Solving Quadratic Equations Using the Quadratic Formula

By solving the general quadratic equation $ax^2 + bx + c = 0, \ a \neq 0$ using a method called completing the square, we obtain **the quadratic formula** which can be used to solve *any* quadratic equation.

The Quadratic Formula: The solution to the quadratic equation $ax^2 + bx + c = 0, \ a \neq 0$ is given by the formula $x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$.

Objective 5: Using the Discriminant to Determine the Type of Solutions of a Quadratic Equation

Given a quadratic equation of the form $ax^2 + bx + c = 0, \quad a \neq 0$, the expression $b^2 - 4ac$ is called the **discriminant**. Knowing the value of the discriminate can help us determine the number and nature of the solutions to a quadratic equation.

> **The Discriminant:** Given a quadratic equation $ax^2 + bx + c = 0, \quad a \neq 0$, the expression $D = b^2 - 4ac$ is called the **discriminant**.
>
> If $D > 0$, then the quadratic equation has two real solutions.
> If $D < 0$, then the quadratic equation has two non-real solutions.
> If $D = 0$, then the quadratic equation has exactly one real solution.