PERSAMAAN & PERTIDAKSAMAAN KUADRAT

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1.2 Quadratic Equations

PREPARING FOR THIS SECTION *Before getting started, review the following:*

- Factoring Polynomials (Section R.5, pp. 49–55)
- Zero-Product Property (Section R.1, p. 13)
- Square Roots (Section R.2, pp. 23–24)
- Complete the Square (Section R.5, p. 56)

Now Work the 'Are You Prepared?' problems on page 101.

OBJECTIVES
1. Solve a Quadratic Equation by Factoring (p. 93)
2. Solve a Quadratic Equation by Completing the Square (p. 95)
3. Solve a Quadratic Equation Using the Quadratic Formula (p. 96)
4. Solve Problems That Can Be Modeled by Quadratic Equations (p. 99)

Quadratic equations are equations such as

$$2x^2 + x + 8 = 0$$
$$3x^2 - 5x + 6 = 0$$
$$x^2 - 9 = 0$$

DEFINISI

A **quadratic equation** is an equation equivalent to one of the form

$$ax^2 + bx + c = 0 \qquad (1)$$

where a, b, and c are real numbers and $a \neq 0$.

Menyelesaikan persamaan kuadrat

1. Faktorisasi

   -Metode akar kuadrat

2. Melengkapkan kuadrat sempurna

3. Menggunakan rumus kuadrat

Quadratic Formula

Consider the quadratic equation

$$ax^2 + bx + c = 0 \qquad a \neq 0$$

If $b^2 - 4ac < 0$, this equation has no real solution.
If $b^2 - 4ac \geq 0$, the real solution(s) of this equation is (are) given by the **quadratic formula:**

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \qquad (5)$$

Discriminant of a Quadratic Equation

For a quadratic equation $ax^2 + bx + c = 0$:

1. If $b^2 - 4ac > 0$, there are two unequal real solutions.
2. If $b^2 - 4ac = 0$, there is a repeated solution, a root of multiplicity 2.
3. If $b^2 - 4ac < 0$, there is no real solution.

SUMMARY Procedure for Solving a Quadratic Equation

To solve a quadratic equation, first put it in standard form:

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

Then:

STEP 1: Identify a, b, and c.

STEP 2: Evaluate the discriminant, $b^2 - 4ac$.

STEP 3: (a) If the discriminant is negative, the equation has no real solution.

(b) If the discriminant is zero, the equation has one real solution, a repeated root.

(c) If the discriminant is positive, the equation has two distinct real solutions.

If you can easily spot factors, use the factoring method to solve the equation. Otherwise, use the quadratic formula or the method of completing the square.