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# Quadratic Expressions

IGCSE Mathematics

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# 1 Introduction to Quadratic Expressions

**Note**

Quadratic expressions are one of the most important topics in IGCSE Mathematics. They appear throughout algebra, coordinate geometry, and problem-solving. Understanding how to expand, factorise, and manipulate quadratic expressions is essential for success.

**In this chapter, we will explore:**

- What quadratic expressions are
- Expanding the product of two binomials
- Factorising quadratic expressions
- The difference of two squares
- Perfect square trinomials
- Mixed and more complex expressions

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# 2 What is a Quadratic Expression?

**Definition**

A **quadratic expression** is a polynomial of degree 2. Its general form is:

$$ax^2 + bx + c$$

where:

- $a$, $b$, and $c$ are constants (numbers)
- $a \neq 0$ (there must be an $x^2$ term)
- $x$ is the variable

The coefficient $a$ is called the **leading coefficient**, $b$ is the coefficient of the linear term, and $c$ is the **constant term**.
**Examples:**

- $3x^2 + 5x - 7 \quad (a = 3,\ b = 5,\ c = -7)$
- $x^2 - 4 \quad (a = 1,\ b = 0,\ c = -4)$
- $-2x^2 + x \quad (a = -2,\ b = 1,\ c = 0)$

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**Note**

**Key Terminology:**

- A **monomial** has one term: e.g. $5x^2$
- A **binomial** has two terms: e.g. $x + 3$
- A **trinomial** has three terms: e.g. $x^2 + 7x + 10$

Most quadratic expressions you encounter will be trinomials, but some (like $x^2 - 9$) are binomials.

**Warning**

**Common Mistake:** Confusing expressions with equations!

- $x^2 + 3x - 10$ is a quadratic **expression** (no equals sign)
- $x^2 + 3x - 10 = 0$ is a quadratic **equation** (has an equals sign)

# Preview ends here

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