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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

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:

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

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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