

Chapter 2

Quadratics

Chapter Overview

1. Solving Quadratic Equations
2. Quadratic Functions
3. Quadratic Graphs
4. The Discriminant
5. Modelling with Quadratics

2.3	<p>Work with quadratic functions and their graphs.</p> <p>The discriminant of a quadratic function, including the conditions for real and repeated roots.</p> <p>Completing the square.</p> <p>Solution of quadratic equations</p> <p>including solving quadratic equations in a function of the unknown.</p>	<p>The notation $f(x)$ may be used</p> <p>Need to know and to use</p> <p>$b^2 - 4ac > 0$, $b^2 - 4ac = 0$ and $b^2 - 4ac < 0$</p> $ax^2 + bx + c = a\left(x + \frac{b}{2a}\right)^2 + \left(c - \frac{b^2}{4a}\right)$ <p>Solution of quadratic equations by factorisation, use of the formula, use of a calculator and completing the square.</p> <p>These functions could include powers of x, trigonometric functions of x, exponential and logarithmic functions of x.</p>
-----	--	---

Solving Quadratic Equations



Examples

1. $(x - 1)^2 = 5$

2. $x^2 + 5x - 6 = 0$

3. Solve $x - 6\sqrt{x} + 8 = 0$

4. $x^2 + 5x - 6 = 0$

Test your understanding

1. $(x + 3)^2 = x + 5$

2. $(2x + 1)^2 = 5$

3. $\sqrt{x + 3} = x - 3$

4. $2x + \sqrt{x} - 1 = 0$

Extension

- (i) Use the substitution $\sqrt{x} = y$ (where $y \geq 0$) to find the real root of the equation

$$x + 3\sqrt{x} - \frac{1}{2} = 0.$$

- (ii) Find all real roots of the following equations:

(a) $x + 10\sqrt{x + 2} - 22 = 0;$

(b) $x^2 - 4x + \sqrt{2x^2 - 8x - 3} - 9 = 0.$