Chapter 2

Quadratics

Chapter Overview

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

2.3	Work with quadratic
	functions and their graphs.

The discriminant of a quadratic function, including the conditions for real and repeated roots.

Completing the square.

Solution of quadratic equations

including solving quadratic equations in a function of the unknown.

The notation f(x) may be used

Need to know and to use

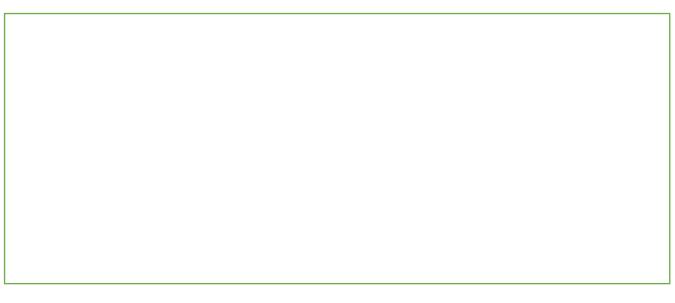
$$b^2 - 4ac > 0$$
, $b^2 - 4ac = 0$ and $b^2 - 4ac < 0$

$$ax^{2} + bx + c = a\left(x + \frac{b}{2a}\right)^{2} + \left(c - \frac{b^{2}}{4a}\right)$$

Solution of quadratic equations by factorisation, use of the formula, use of a calculator and completing the square.

These functions could include powers of x, trigonometric functions of x, exponential and logarithmic functions of x.

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

- Use the substitution $\sqrt{x} = y$ (where $y \ge 0$) to find the real root of the equation (i) $x + 3\sqrt{x} - \frac{1}{2} = 0$.
- Find all real roots of the following equations:

 - (a) $x + 10\sqrt{x+2} 22 = 0$; (b) $x^2 4x + \sqrt{2x^2 8x 3} 9 = 0$.