Pearson Edexcel

Solving quadratic equations without factorising

A LEVEL LINKS
Scheme of work: 1b. Quadratic functions – factorising, solving, graphs and the discriminants

Key points

- A quadratic equation is an equation in the form $ax^2 + bx + c = 0$ where $a \neq 0$.
- To factorise a quadratic equation find two numbers whose sum is b and whose products is ac.
- When the product of two numbers is 0, then at least one of the numbers must be 0.
- If a quadratic can be solved it will have two solutions (these may be equal).

Example 1 Solve $(x + 3)^2 = 5$. Give your solutions in surd form.

$(x + 3)^2 = 5$ $x + 3 = \pm\sqrt{5}$ $x = \pm\sqrt{5} - 3$ So $x = -\sqrt{5} - 3$ or $x = \sqrt{5} - 3$	**1** Rearrange the equation to work out x. First, add 5 to both sides. **2** Square root both sides. Remember that the square root of a value gives two answers. **3** Subtract 3 from both sides to solve the equation. **4** Write down both solutions.

Practice questions

1 Solve

a $(x + 1)^2 = 7$ **b** $5x^2 = 20$

c $(x - 4)^2 = 8$ **d** $(2x - 3)^2 = 36$

Answers

1 **a** $x = -\sqrt{7} - 1$ or $x = \sqrt{7} - 1$ **b** $x = -2$ or $x = 2$

c $x = 4 - 2\sqrt{2}$ or $x = 4 + 2\sqrt{2}$ **d** $x = \frac{9}{2}$ or $x = -\frac{3}{2}$