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Solving Quadratic Equations Using Factorisation

Solutions & Answer Key

Full worked solutions, marking scheme & answer key

IGCSE Mathematics

The Panda Math Tutor

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Companion to the *Student Worksheet*

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Note

About this booklet. These are the complete solutions to every question in the *Solving Quadratic Equations Using Factorisation — Student Worksheet*. Question numbers match exactly: zero product property Z1–Z6, monic quadratics M1–M10, non-monic quadratics N1–N8, difference of two squares D1–D7, perfect squares S1–S7, rearranging R1–R9, applied problems A1–A8, the Mixed Review MR1–MR10, and the examination questions Q1–Q8 of Part III.
Every solution shows the equation in standard form, the factorised form, and both solutions. Part V collects the common mistakes to watch for, and Part VI is a quick answer key for fast marking.

4 Part IV — Complete Solutions

Note

Each solution names the method being used and works one step at a time, exactly as the notes recommend. Depth is scaled to difficulty — brief for basic questions, fuller for the harder ones. Solutions are joined by "or", never "and".

4.1 Solutions — The Zero Product Property

Solution Z1

The equation is already factorised, so apply the zero product property:

$$x - 7 = 0 \quad \text{or} \quad x + 2 = 0$$

$$\boxed{x = 7 \quad \text{or} \quad x = -2}$$

Check: $(7 - 7)(7 + 2) = (0)(9) = 0$ ✓

Solution Z2

$$x + 9 = 0 \quad \text{or} \quad x + 5 = 0$$

$$\boxed{x = -9 \quad \text{or} \quad x = -5}$$

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Solution Z3

The two factors are x and $(x-15)$:

$$x = 0 \quad \text{or} \quad x - 15 = 0$$

$$\boxed{x = 0 \ \text{ or } \ x = 15}$$

Why not divide by x? Dividing both sides by x gives $x - 15 = 0$ and only the answer $x = 15$. This throws away the solution $x = 0$ — and dividing by x is only valid if $x \neq 0$, which is exactly the case we would be discarding. Never divide an equation by a term containing the unknown.

Solution Z4

$$3x - 8 = 0 \quad \text{or} \quad x + 4 = 0$$

$$3x = 8 \quad \text{or} \quad x = -4$$

$$\boxed{x = \tfrac{8}{3} \ \text{ or } \ x = -4}$$

Solution Z5

$$2x + 7 = 0 \quad \text{or} \quad 5x - 3 = 0$$

$$2x = -7 \quad \text{or} \quad 5x = 3$$

$$\boxed{x = -\tfrac{7}{2} \ \text{ or } \ x = \tfrac{3}{5}}$$

Solution Z6

What is wrong. The zero product property applies only when the product is *zero*. Here the product is 6, and there are infinitely many pairs of numbers that multiply to give 6, so there is no reason for either bracket to equal 6 on its own.
Testing the student's answers: with $x = 10$, $(10-4)(10+1) = (6)(11) = 66$, not 6. So $x = 10$ is not a solution at all.
Correct method. Expand and rearrange to standard form:

$$x^2 - 3x - 4 = 6$$

$$x^2 - 3x - 10 = 0$$

Two numbers with sum -3 and product -10 are -5 and 2:

$$(x-5)(x+2) = 0$$

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Preview ends here

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