

Quadratic Formula Guide

A printable quadratic formula guide explaining coefficients, the discriminant, solution types, and a complete worked example.

What does Δ mean?

Δ is capital delta, shorthand for the discriminant $b^2 - 4ac$. Its sign determines which solution case applies.

Solutions

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Discriminant

$$\Delta = b^2 - 4ac$$

If $\Delta > 0$

Two distinct real solutions

If $\Delta = 0$

One repeated real solution

If $\Delta < 0$

Two complex solutions

Coefficients

$$a = 2, b = -3, c = -2$$

Substitute

$$x = \frac{3 \pm \sqrt{25}}{4}$$

Solutions

$$x = 2 \text{ or } x = \frac{-1}{2}$$

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01 The formula

For $ax^2 + bx + c = 0$ with $a \neq 0$.

Solutions

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Discriminant

$$\Delta = b^2 - 4ac$$

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02 What the discriminant says

Δ (capital delta) is the discriminant $b^2 - 4ac$. Its sign classifies the roots before you finish.

If $\Delta > 0$

Two distinct real solutions

If $\Delta = 0$

One repeated real solution

If $\Delta < 0$

Two complex solutions

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03 Worked example

Solve $2x^2 - 3x - 2 = 0$.

Coefficients

$$a = 2, b = -3, c = -2$$

Substitute

$$x = \frac{3 \pm \sqrt{25}}{4}$$

Solutions

$$x = 2 \text{ or } x = \frac{-1}{2}$$

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HOW TO REMEMBER IT

Write standard form before substituting

1

Move every term to one side so the other side is zero.

2

Copy a, b, and c with their signs.

3

Put $-b \pm \sqrt{b^2 - 4ac}$ together over the full denominator $2a$.