

Quadratic equations

Solve quadratic equations by factorising or using the quadratic formula, and check every root.

Recognise the standard form

Write the equation as $ax^2 + bx + c = 0$, where a is not zero. Move every term to one side before choosing a method.

Choose a method

Factorise when the factors are easy to identify. Otherwise use $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$. The discriminant $b^2 - 4ac$ tells you whether real roots exist.

Formula sheet

$$ax^2 + bx + c = 0$$

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

$$\text{Discriminant } \Delta = b^2 - 4ac$$

Worked example

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

1. Find two numbers whose product is 6 and whose sum is -5: -2 and -3.
2. Factorise: $(x - 2)(x - 3) = 0$.
3. Set each factor to zero: $x = 2$ or $x = 3$.
4. Check: $2^2 - 5(2) + 6 = 0$, and $3^2 - 5(3) + 6 = 0$.

Try it yourself

1. Solve $x^2 - 7x + 12 = 0$.
2. How many real roots does $x^2 + 4x + 5 = 0$ have?

Check your answers

1. $(x - 3)(x - 4) = 0$, so $x = 3$ or $x = 4$.
2. $\Delta = 16 - 20 = -4$. There are no real roots.

Common mistake

Do not divide by x while solving: it can remove the valid root $x = 0$.

Source and scope

Original Pass Papers ZA revision notes; curriculum reference linked below.

Updated 2026-10-28. Selected revision topics, not an official examination paper. Check your teacher's scope.

Official DBE curriculum / textbook reference

Read online: <https://passpapers.co.za/study/revision/grade-12-mathematics-quadratic-equations>