

Quadratic Equations (Mathematics)

An equation of the form $ax^2 + bx + c = 0$ ($a \neq 0$) is called a quadratic equation in x .

The solutions to these equations represent geometrically where the parabola cuts the x -axis.

A quadratic equation may have:

- **0 solutions** – the parabola is entirely above or below the x -axis
- **1 solution** – the parabola touches the x -axis (perfect square)
- **2 solutions** – the parabola cuts the x -axis in two places

Completing the square

1. Make the coefficient of x^2 be 1 (i.e. divide all the terms by the coefficient of 1).
2. Move the constant term to the RHS.
3. Complete the square on the LHS and add the same amount to the RHS.
4. Express the LHS as a perfect square.
5. Solve.

Quadratic Formula

Solutions are given by:

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

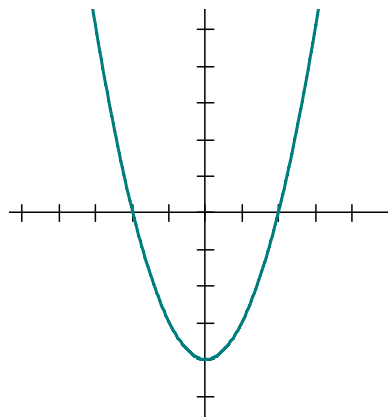
Quadratic Inequalities

Find the solutions to the quadratic formula and plot them onto a number line. Then pick a point (or a few points) to test which part of the number line is the correct part.

OR

Draw the parabola to see which region is required.

Example



$$x^2 - 4 > 0$$

Clearly this corresponds to $x < -2$ and $x > 2$ as the parabola is above the x -axis for this domain.