

Quadratic functions (AS)

B3 Work with quadratic functions and their graphs; the discriminant of a quadratic function, including the conditions for real and repeated roots; completing the square; solution of quadratic equations including solving quadratic equations in a function of the unknown.

For a brief commentary on this content go to the [MEI outline SoW](#).

Pre-requisites

[Transition to A level Maths: Essential Skills](#)

There are a host of useful foundational resources across the various Essential Skills. Dependent on the needs of your students the following will be useful:

- Expanding skill see 'Double Brackets';
- Factorising skill see 'Factorising' and 'Completing the Square';
- Solving skill see 'Quadratic Equations';
- Sketching skill see 'Quadratic Sketching'.

Teaching it!

- A series of six [videos](#) designed to support students on this topic.
- [Quadratics Two-way table](#): Card sort linking algebraic & graphical representations.
- Desmos Classroom activity [Marbleslides Parabolas](#).
- [RISP #37 Parabolic Clues](#): Rich task prompting students to consider the relationship between the coefficients of a quadratic function and the corresponding curve.
- [Quadratic solving sorter](#): A fluency exercise from Underground Mathematics.
- Graphs of quadratic functions (student task): [Autograph](#), [Desmos](#), [GeoGebra](#).

Common student errors

- Difficulty in completing the square when the coefficient of x^2 is not equal to 1.
- Thinking that the discriminant is given by $\sqrt{b^2 - 4ac}$ rather than $b^2 - 4ac$.
- Quoting the quadratic formula incorrectly.
- Not always recognising when they are dealing with a quadratic-type equation e.g. $2x^6 + 3x^3 = 7$.

Getting them thinking

- Make up three questions that show you understand three different methods for solving a quadratic equation.
- Change one coefficient in $y = 1x^2 + 6x + 8$ so that the x -axis is a tangent to the graph.
- Prove the quadratic formula.