



Further Maths – Bridging Work

Welcome to Further Mathematics

Congratulations on choosing to study A Level Further Mathematics. The course is challenging, rewarding, and designed for students who enjoy solving problems, exploring mathematical ideas, and thinking deeply about mathematics beyond the GCSE curriculum.

The purpose of this bridging work is to help you develop the mathematical habits and resilience needed for success in Further Mathematics. The tasks are designed to encourage investigation, reasoning, communication, and problem-solving rather than simply applying routine methods.

What You Need to Do

You have been provided with **five mathematical investigations**.

Minimum Requirement

You must complete **at least THREE of the FIVE tasks**.

Challenge

Students aiming for the highest grades are strongly encouraged to complete **all FIVE tasks**.

Expectations

For each task, you should produce a clear, well-presented solution that demonstrates your thinking.

Your work should include:

- A clear statement of the problem.
- Diagrams, graphs, sketches or constructions where appropriate.
- Full mathematical working.
- Explanations written in sentences, not just calculations.
- Any patterns, observations or conjectures you discover.
- A final conclusion answering all questions posed.
- Reflection:
 1. What did you find difficult?
 2. What mathematical ideas did you use?
 3. Could the problem be solved in a different way?



Presentation Standards

Your work should be:

- Completed neatly on A4 paper or electronically.
- Organised with clear headings.
- Written using correct mathematical notation.
- Submitted in a folder or booklet at the start of Year 12.

Remember that in Further Mathematics, communication is just as important as obtaining the correct answer.

The Tasks

Task 1 – Name That Graph

Investigate different ways of finding equations of quadratic graphs and compare different forms of a quadratic equation.

Focus Skills

- Quadratic functions
- Completing the square
- Factorised form
- Graph interpretation
- Mathematical reasoning

Extension

Can you develop a method that would work for *any* parabola?

Task 2 – Quadratic Solving Sorter

Sort a collection of quadratic equations into meaningful groups and justify your choices.

Focus Skills

- Solving quadratics
- Discriminant
- Factorisation



- Classification
- Mathematical communication

Extension

Create your own classification system and explain why it is useful.

Task 3 – Between the Lines

Investigate the relationship between areas formed by parallel linear functions and determine the unknown area.

Focus Skills

- Coordinate geometry
- Area under graphs
- Similarity
- Algebraic reasoning

Extension

Generalise the result using algebra.

Task 4 – A Perfect Fit

Investigate the construction of an inscribed circle inside a right-angled triangle and explore conditions for a given radius.

Focus Skills

- Geometry
- Construction
- Circle properties
- Proof and justification

Extension

Can you find every right-angled triangle whose inscribed circle has radius 6?

Task 5 – What Is a Tangent?



Explore different definitions of a tangent and decide which definitions are mathematically valid.

Focus Skills

- Calculus foundations
- Mathematical definitions
- Counterexamples
- Critical thinking

Extension

Write your own rigorous definition of a tangent suitable for an A Level mathematician.

How Your Work Will Be Used

During the first few weeks of Year 12, we will use these tasks to:

- Discuss different approaches to problem solving.
- Share mathematical ideas with others.
- Develop presentation and communication skills.
- Prepare for the style of thinking required in Further Mathematics.

There is often no single "correct" method. What matters is your ability to justify your reasoning and communicate your mathematics clearly.

Submission Date

First Further Mathematics lesson in September

Final Advice

Further Mathematics is not about being quick, it is about being curious, resilient and willing to explore unfamiliar ideas.

Take your time, show your thinking, and enjoy the challenge.