

SNA A-level Further Mathematics



AQA A-Level Further Mathematics: Overview

What is A-Level Further Mathematics?

A-Level Further Mathematics is an advanced mathematics qualification that builds upon the core skills developed in A-Level Mathematics. It's designed for students who have a strong passion for mathematics and want to deepen their understanding of mathematical concepts. This qualification offers students the opportunity to explore more complex and abstract areas of mathematics that are used in higher education, particularly in subjects like engineering, physics, economics, and computer science.

A-level Further Mathematics is studied in addition to A-level Mathematics.

Who Should Consider Studying Further Mathematics?

- **Students aiming for competitive university courses:** Particularly useful for those looking to study mathematics, engineering, physics, computer science, or related fields at top universities.
- **Mathematics enthusiasts:** If you have a genuine interest in mathematics and enjoy solving complex problems, Further Mathematics offers a challenging but rewarding experience.
- **Those wanting to differentiate themselves:** This qualification demonstrates to universities and employers that you have exceptional analytical skills and an advanced understanding of mathematics.

What Does A-Level Further Mathematics Include?

1. Further Pure Mathematics

This is the heart of Further Mathematics and includes advanced mathematical theory:

- **Complex numbers:** Understand the algebra and geometry of complex numbers, and their applications.
- **Matrices:** Learn how to solve systems of linear equations using matrices, and delve into the theory of transformations.
- **Proof:** Develop the ability to rigorously prove mathematical results using formal methods.
- **Vectors:** Explore the geometry of vectors in three dimensions, including dot products and cross products.
- **Differential Equations:** Study methods for solving equations that describe changing systems.
- **Series and Sequences:** Learn more about convergence, divergence, and series expansions, including Taylor series.

2. Further Mechanics

Expanding on the mechanics content from A-Level Mathematics, this includes:

- **Momentum and Impulse:** Study the impact of forces on motion and the conservation of momentum.
- **Work, Energy, and Power:** Examine the relationships between force, energy, and motion.
- **Circular Motion:** Understand the forces acting on objects moving in circles, and how this applies to real-world situations like planetary orbits.

3. Discrete Mathematics

Explore the Mathematics behind algorithms

- **Graphs and networks:** Apply algorithms to solve real-world problems like shortest paths, flow, and optimization.
- **Critical path analysis:** Manage a project, helping to optimize scheduling and identify the minimum project completion time
- **Game theory:** Game Theory analyzes strategic decision-making in competitive situations, with applications in economics, politics, and social sciences.

Assessment Structure

AQA's A-Level Further Mathematics is assessed through three exams at the end of the two-year course:

1. **Paper 1: Further Pure Mathematics**

This paper assesses the core pure content you've studied throughout the course.

2. **Paper 2: Further Pure Mathematics**

A second exam on pure mathematics, which also covers topics such as differential equations, matrices, and complex numbers.

3. **Paper 3: Optional Content**

This paper includes the mechanics, statistics, or decision mathematics modules you choose. It might focus on further mechanics, further statistics, or other applications like decision mathematics or numerical methods.

Why Study Further Mathematics?

- **Higher Understanding:** You'll gain a deeper insight into mathematics that goes far beyond the A-Level standard.
- **University Preparation:** For those aiming to study mathematically intense degrees, Further Mathematics provides the skills and knowledge needed to succeed.
- **Career Opportunities:** Whether you pursue mathematics directly or another technical field, the analytical thinking and problem-solving skills gained through Further Mathematics are highly valued by employers.
- **Challenge and Satisfaction:** It offers a level of intellectual challenge that will push your problem-solving skills to new heights. It's incredibly rewarding for those who enjoy maths.

What Can I Do After A-Level Further Mathematics?

- **University:** Pursue degrees in mathematics, engineering, physics, computer science, economics, or actuarial science.
- **Careers:** Work in industries like finance, software development, engineering, research, and technology. The logical and analytical skills you develop are transferable to many fields.

How Can I Succeed in Further Mathematics?

- **Strong Foundation:** Make sure you're comfortable with all of the concepts in A-Level Mathematics, as this will form the base for Further Mathematics.
 - **Regular Practice:** Further Mathematics can be abstract and challenging, so consistent practice and problem-solving are key to mastering the material.
 - **Seek Support:** Don't hesitate to ask for help when needed. Mathematics is often best understood through discussion and problem-solving in groups or with a teacher.
 - **Stay Curious:** The more you immerse yourself in different mathematical problems, the more you'll develop a deeper understanding and appreciation for the subject.
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Key Takeaways:

- **Challenge yourself with a deeper dive into mathematics.**
- **Explore abstract concepts and solve complex problems.**
- **Prepare for university courses in mathematics, engineering, and science.**
- **Open up a wide range of career opportunities that value high-level analytical skills.**

Interested?

If you're passionate about mathematics and looking for a challenge, A-Level Further Mathematics could be the perfect next step for you. Come talk to us at the open evening to find out more about how we can support you in excelling in this exciting and rewarding subject!