

Subject on a Page: Mathematics



In a nutshell:

Mathematics is the study of patterns, structures and relationships using logic and quantitative reasoning. It develops problem-solving skills, sharpens analytical thinking and provides powerful tools to understand and model the world around us. Studying maths opens doors to a wide range of disciplines and careers, from science and engineering to finance and technology.

In Mathematics we:

- Learn and understand key mathematical concepts, methods and techniques, building confidence in using numbers, algebra, geometry, calculus and more.
- Apply mathematical skills to solve real and abstract problems, using logic and reasoning to make sense of complex situations.
- Explore different ways to approach problems, evaluate solutions, and communicate our thinking clearly and accurately using correct mathematical language.

Think like a Mathematician :

- Look for patterns, connections and logical structures in problems, even in unfamiliar or complex situations.
- Break problems down into smaller steps, using reasoning and creative thinking to explore different approaches.
- Question assumptions, test ideas and consider whether solutions make sense in context.
- Use evidence and clear arguments to justify your thinking, and be open to refining methods or finding more efficient solutions.

Write and talk like a Mathematician :

- Algebra and equations
- Graphs and transformations
- Calculus
- Trigonometry
- Sequences, series and binomial expansion
- Coordinate geometry and vectors
- Exponential and logarithmic functions
- Statistical sampling and data presentation
- Probability and distributions
- Kinematics and forces

Read like a Mathematician :

- Edexcel A Level Mathematics Year 1 & Year 2 Textbooks – Pearson
- A-Level Maths Complete Revision & Practice – CGP
- How to Think Like a Mathematician – Kevin Houston
- The Mathematics of Love – Hannah Fry
- Alex's Adventures in Numberland – Alex Bellos
- Humble Pi: A Comedy of Maths Errors – Matt Parker
- The Art of Statistics – David Spiegelhalter
- In Pursuit of the Unknown: 17 Equations That Changed the World – Ian Stewart
- Fermat's Last Theorem – Simon Singh
- Weapons of Math Destruction – Cathy O'Neil

Revise like a Mathematician :

- Use your knowledge organisers, formula book and revision guides to review key concepts and methods
- Create flashcards for formulas, rules and key techniques across algebra, calculus, statistics and mechanics
- Work through practice questions by topic to test your understanding and spot gaps
- Quiz with friends and explain your working out loud to build confidence and accuracy
- Use online resources like ExamSolutions, DrFrostMaths and Physics & Maths Tutor for guided revision and video walkthroughs
- Complete past papers under timed conditions and review mark schemes carefully
- Focus on showing clear working, using correct notation, and checking your answers for accuracy

Experience it like a Mathematician :

- Explore real-world applications by following news stories involving data, finance, technology and science
- Watch documentaries and videos about maths in nature, engineering, cryptography and everyday life
- Visit local science museums, planetariums or university maths departments for workshops and exhibitions
- Attend maths or STEM fairs, competitions and clubs to meet like-minded students and professionals. Take part in problem-solving challenges, maths puzzles and research projects to develop your own mathematical investigations
- Engage with online maths communities like Numberphile and Math Stack Exchange to explore ideas and ask questions

Progress to a career in :

- Actuarial science
- Data analysis and statistics
- Engineering and technology
- Finance and banking
- Information technology and cybersecurity
- Operations research and logistics
- Research and academia
- Software development and programming
- Teaching and education
- Quantitative trading and economics
- Science and healthcare technology
- Artificial intelligence and machine learning
- Cryptography and information security
- Environmental science and climate modelling
- Market research and consumer insights
- Architecture and design
- Risk management and insurance
- Medicine
- Sports analytics
- Pharmaceuticals and biostatistics
- Artificial intelligence ethics and policy