

Super-Curricular Guide: Maths



What Does UCAS Say...?

Entry Requirements:

A levels – To get on to a degree in this subject area you will usually require a minimum of two A levels, with three A levels and A/B grades required for the most popular courses. Entry requirements range from BBC to A*AA, with the universities and colleges most commonly asking for AAB.

Maths A level is normally required, with some courses also asking for further maths. Other useful subjects to hold for maths degrees include; physics, chemistry, biology, economics or computer science.

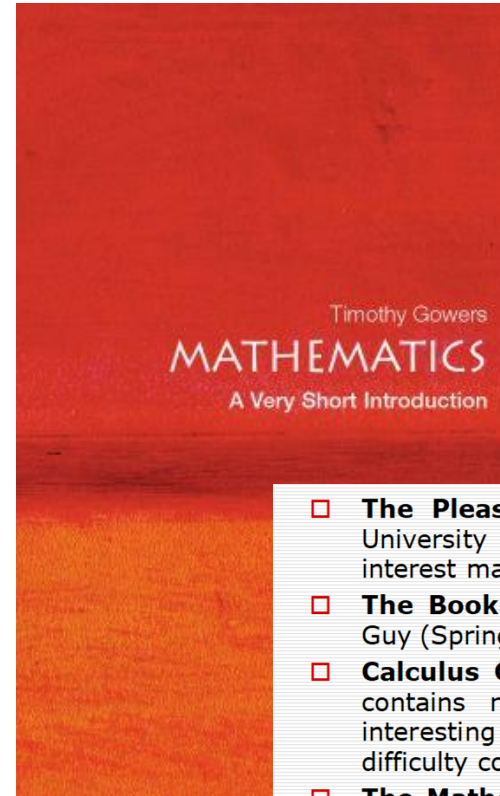
In addition to A levels or equivalent you will also need five GCSEs (A-C) including science, English, and maths.

Vocational courses – Other Level 3/Level 6 qualifications (e.g. a Pearson BTEC Level 3 National Extended Diploma, or Providing Financial Services SCQF Level 6) may be accepted as an alternative.



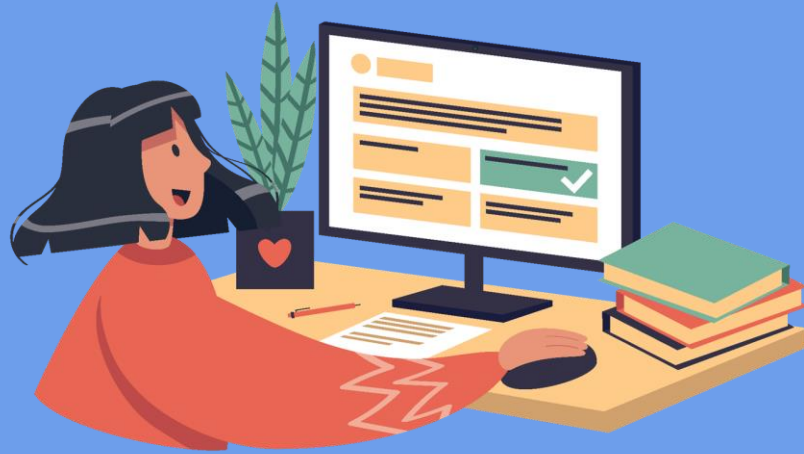


Read!



- ❑ **The Pleasures of Counting** by T. W. Korner (Cambridge University Press 1996); showing the kinds of problems that interest mathematicians.
- ❑ **The Book of Numbers** by John H. Conway and Richard K. Guy (Springer-Verlag 1998).
- ❑ **Calculus Gems** by G. F. Simmons (McGraw Hill). This book contains nuggets of beautiful mathematics placed in an interesting historical context. Topics of varying levels of difficulty cover various aspects of calculus.
- ❑ **The Mathematical Experience** by P.J. Davis and R. Hersch (Birkhauser 1997).
- ❑ **The Shape of Space** by Jeffrey R. Weeks (Dekker 2001). An entertaining introduction to topology and non-Euclidean geometry.
- ❑ **Concepts of Modern Mathematics** by Ian Stewart (Penguin 1975). Ian has written several other suitable books such as *From Here to Infinity* (Oxford Paperbacks, 1996), *Nature's Numbers* (Phoenix 1998), and *Does God play Dice?* (Penguin 1997).
- ❑ **What is Mathematics?** by Richard Courant and Herbert Robbins, 2nd ed. (Oxford University Press, USA 1996)
- ❑ **The Music of the Primes: Why an Unsolved Problem in Mathematics Matters** by Marcus du Sautoy (HarperPerennial, 2004).
- ❑ **Indra's Pearls: The Vision of Felix Klein**, by David Mumford, Caroline Series, David Wright (Cambridge University Press, 2002); beautiful pictures, starts with Complex Numbers.

<https://www.maths.cam.ac.uk/undergrad/admissions/step>



Click!

- Advanced Problem-Solving resources from RICH. This is an accessible and structured introduction to advanced problem solving, which will help build confidence, fluency and speed. An excellent starting point.
- STEP questions with solutions at Underground Mathematics. The Underground Mathematics website, funded by the DfE and based at the University of Cambridge, offers free resources to support the teaching of A level mathematics, as well as selected past STEP. Questions with fully worked solutions and explanations
- Advanced Problems in Mathematics by Dr Stephen Siklos. We emphasise that Dr Siklos book is free to download in PDF format as well as being available as a paperback to purchase). The book, which is a revised and extended version of two earlier books, analyses recent STEP questions selected to address the syllabus for Papers I and I. Each question is followed by a comment and a full solution. The solutions point students to the methodology required to address advanced mathematical problems critically and independently.
- All past papers from 1998 are available to download from Cambridge Assessment and include:
 - answers to an questions Trom Zoos,
 - solutions with explanation and mark scheme for the 2011 STEP I paper.
- Meikleriggs Mathematics: Dr Peter Mitchell's web site contains lots of useful mathematics including complete solutions to STEP



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Birmingham Popular Maths Lectures

The Birmingham Popular Mathematics Lectures are open to all members of the public and the University who are interested in the study of Mathematics. They are particularly suitable for those studying Mathematics at A Level and we also welcome advanced GCSE students. Young people are welcome on their own, with parents or with a school group.

The lectures are free of charge and in general there is no need to register. The lectures runs in the Watson Building (School of Mathematics) on the last Wednesday of each month, arriving from 6.30pm onwards for a 7pm start. Please note that the LMS lectures in September have different timing and you will need to register, see below.

If you are travelling by minibus please contact us to arrange parking, otherwise please see the University's [general travel information](#) which includes a campus map, where the Watson Building is labelled R15.

Please contact the [Outreach and Schools Liaison Officer](#) for more information.

In 'News and events'

- > Birmingham to host the British Combinatorial Conference 2019
- > Latest news
- > Research conferences and seminars
- > **Birmingham Popular Maths Lecture**
- > Newsletter

Check out your local Universities for public mathematics lectures!



Watch!

Talks about Math



Eugenia Cheng
An unexpected tool for understanding inequality: abstract math
Posted Mar 2019



Li Wei Tan
The fascinating science of bubbles, from soap to champagne
Posted Dec 2018



Liv Boeree
3 lessons on decision-making from a poker champion
Posted Oct 2018



Tommy McCall
The simple genius of a good graphic
Posted Sep 2018



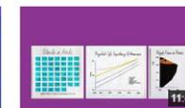
Irina Kareva
Math can help uncover cancer's secrets
Posted Apr 2018



Vittorio Loreto
Need a new idea? Start at the edge of what is known
Posted Mar 2018



Mohamad Jebara
This company pays kids to do their math homework
Posted Feb 2018



Mona Chalabi
3 ways to spot a bad statistic
Posted Mar 2017



Alan Smith
Why you should love statistics
Posted Jan 2017



Dan Bricklin
Meet the inventor of the electronic spreadsheet
Posted Jan 2017



Roger Antonsen
Math is the hidden secret to understanding the world
Posted Nov 2016



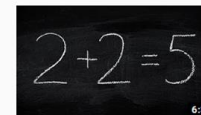
Rainn Wilson
Ideas worth dating
Posted Oct 2016

<https://www.ted.com/topics/math>

https://www.youtube.com/results?search_query=maths



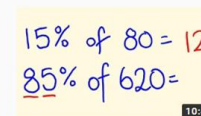
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Hi everyone! Mathematics is one of the basic school subjects. But while some people find exact sciences enlightening, others ...



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Ideaman • 6.1M views • 1 year ago
A well meaning math teacher finds herself trumped by a post-fact America.
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Percentage Trick - Solve percentages mentally - percentages made easy with the cool math trick!
tecmath • 6.5M views • 6 years ago
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9 Math Riddles That'll Stump Even Your Smartest Friends
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Subtitles:



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Mathematics
 Melvyn Bragg examines the way perceptions of the importance of mathematics have fluctuated in the 20th century and what mathematics can reveal about how life began, and how it might continue.

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<http://furthermaths.org.uk/podcasts>

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The FMSP has worked with Peter Rowlett (lecturer at Nottingham Trent University and presenter of the 'Travels in a Mathematical World' podcast series) and Katie Steckles (of Think Maths and Numberphile) to produce a series of podcasts called "Taking Maths Further".

Every episode takes a topic from the A level Maths or Further Maths syllabus and looks at its applications. Each episode includes an interview with someone working using related mathematics. Each podcast has an associated puzzle and further reading designed to stimulate students' interest in mathematics outside of the curriculum.

Episode list:

- Episode 1 - Crime Scene Investigation, forensics and Bayes' theorem
- Episode 2 - Statistical sampling in archaeology
- Episode 3 - Cellular automata, graph theory and brains
- Episode 4 - Nautical Radar and quadratic equations
- Episode 5 - CERN and standard deviation
- Episode 6 - Exponential growth in Pensions
- Episode 7 - Astrophysics and trigonometry
- Episode 8 - Packing shapes and graphene
- Episode 9 - Structural engineering and coordinates
- Episode 10 - Numbers, infinite and music
- Episode 11 - Programming and boolean algebra
- Episode 12 - Regression and traffic management
- Episode 13 - Vectors matrices and hearing
- Episode 14 - Maths and art
- Episode 15 - Accountancy and cash management
- Episode 16 - Actuarial science and normal distributions
- Episode 17 - Nuclear reactors and modelling
- Episode 18 - Medical Imaging and Fourier Analysis
- Episode 19 - Computer games and mechanics
- Episode 20 - Calculus and fluid dynamics

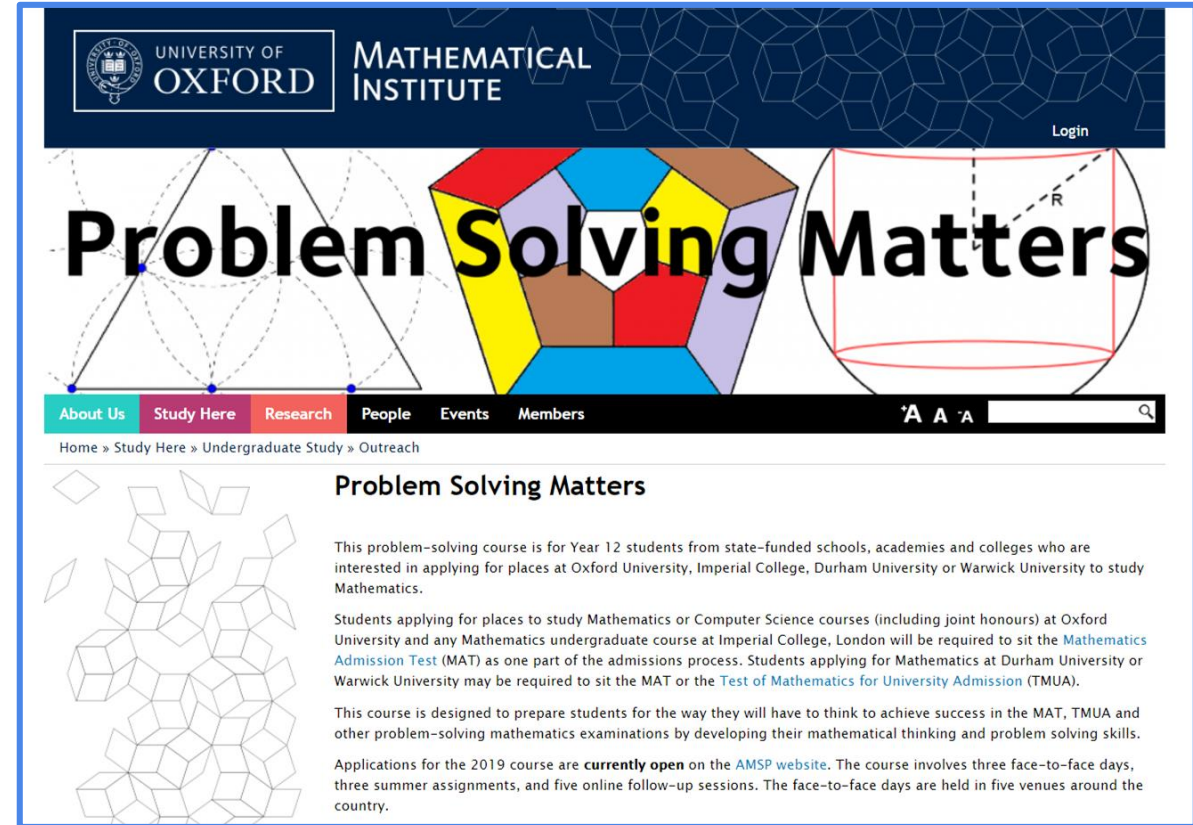


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Problem Solving Matters

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Problem Solving Matters

This problem-solving course is for Year 12 students from state-funded schools, academies and colleges who are interested in applying for places at Oxford University, Imperial College, Durham University or Warwick University to study Mathematics.

Students applying for places to study Mathematics or Computer Science courses (including joint honours) at Oxford University and any Mathematics undergraduate course at Imperial College, London will be required to sit the [Mathematics Admission Test \(MAT\)](#) as one part of the admissions process. Students applying for Mathematics at Durham University or Warwick University may be required to sit the MAT or the [Test of Mathematics for University Admission \(TMUA\)](#).

This course is designed to prepare students for the way they will have to think to achieve success in the MAT, TMUA and other problem-solving mathematics examinations by developing their mathematical thinking and problem solving skills.

Applications for the 2019 course are **currently open** on the [AMSP website](#). The course involves three face-to-face days, three summer assignments, and five online follow-up sessions. The face-to-face days are held in five venues around the country.

<https://www.maths.ox.ac.uk/study-here/undergraduate-study/outreach/problem-solving-matters-1>

Keep a Super-Curricular Activities Record for Personal Statement and Interviews

- What did you do?
- What was interesting, significant and relevant?
- How was your perception or view of the subject matter changed?
- What did you agree or disagree with and why?
- What further questions were raised?
- What could you do to explore these questions further?
- What skills or understanding were developed?

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