



## Reading and activities list for Mathematics

### General check-list for Oxbridge preparation

- Complete the course and college research booklet which covers entry requirements for your course (e.g. admissions tests during interviews). Use it to help you make informed choices.
- Respond and maintain email contact with your OMS Mentor and do not hesitate to ask questions which may help your Oxbridge preparation.
- Read British broadsheets such as The Daily Telegraph, The Independent or The Guardian preferably every day (if not feasible, then at weekends). Think critically about what you have read; what issues are raised?; What assumptions are being made? What information is being relied on to draw which conclusions? How would you frame a counter-argument?
- Make note of subject-related terminology to look up definitions with the aim of working them into future academic discussions on your chosen Oxbridge course.
- Keep a "Learning Log". Note down (i) book titles/ articles (ii) author (iii) your thoughts, feelings and observations (iv) context and relevance of the book/article (v) whether you agree with what you have read.

### Subject-specific preparation

- Suggested Mathematics Reading List (Oxford and Cambridge)**  
(from: <http://www.maths.cam.ac.uk/undergrad/admissions/readinglist.pdf> and <https://www.maths.ox.ac.uk/system/files/attachments/introbook13.pdf>)
  - Acheson, David *1089 and All That* (2002)
  - Berlinski, D *Infinite Ascent – A Short History of Mathematics* (2005)
  - Burton, D *The History of Mathematics* (2007)
  - B. Cipra, *What's Happening in the Mathematical Sciences* (AMS, 1993, '94, '96, '99, '02)
  - Clegg, B *A Brief History of Infinity* (2003)
  - Derbyshire, J *Unknown Quantity – A Real and Imaginary History of Algebra* (2006)
  - Devlin, K *Mathematics: The New Golden Age* (1998), *The Millennium Problems* (2004) and *The Unfinished Game* (2008)
  - Du Sautoy, M *The Music of the Primes* (Harper-Collins, 2003)
  - Du Sautoy, M *Finding Moonshine: a mathematician's journey through symmetry* (Fourth Estate, 2008)
  - Underwood, D et al. *Is Mathematics Inevitable? A Miscellany* (2008)
  - Elwes, R *Maths 1001* (2010)
  - Hall, N *The New Scientist Guide to Chaos* (ed.) (Penguin, 1991)
  - Hilton, P; Holton, D; Pedersen, J *Mathematical Reflections* (1998)
  - Houston, K, *How to Think like a Mathematician* (CUP, 2009)
  - Hoffman, P., *Archimedes' Revenge* (Penguin, 1991)
  - Gardner, M *Penrose Tiles to Trapdoor Ciphers* (CUP/Math. Assoc. of America (1997) ([http://maa.org/pubs/focus/Gardner\\_PenroseTilings1-1977.pdf](http://maa.org/pubs/focus/Gardner_PenroseTilings1-1977.pdf)) *The Colossal Book of Mathematics* (2001) and *The Unexpected Hanging and Other Mathematical Diversions* (Chicago 1991) (or any other book by Martin Gardner)
  - Goldstein, R *Incompleteness – The Proof and Paradox of Kurt Gödel* (2005)
  - Gowers, T *Mathematics: a very short introduction* (CUP, 2002)
  - Gray, J *Hilbert's Challenge* (2000)
  - Körner, T.W., *The Pleasures of Counting* (CUP, 1996)
  - Maor, E., *To Infinity and Beyond* (Princeton, 1991)
  - Paulos, J. A., *Beyond Numeracy* (Penguin, 1991)
  - Pestic, P *Abel's Proof* (2004)
  - Piper, F & Murphy, S *Cryptography: A Very Short Introduction* (2002)

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- Ravi, V A *Mathematical Mosaic* (Mathematical Association of America, 1997) (see also: <http://www.maa.org/pubs/books/mtm.html>)
- Singh, S *Fermat's Last Theorem* (Fourth Estate) (2002)
- Singh, S *The Code Book* (2000)
- Stewart, I *Does God Play Dice?: The New Mathematics of Chaos* (Penguin, 1990)
- Stewart, I *Letters to a Young Mathematician* (2006)
- Stewart, I *Game, Set and Math*, (Penguin, 1997)
- Stillwell, J *Mathematics and Its History* (2002)
- Tao, T *Solving Mathematical Problems* (OUP, 2006)
- Taylor, J.C *Hidden Unity in Nature's Laws* (CUP, 2001)
- Wells, D, *The Penguin Dictionary of Curious and Interesting Numbers* (1997)
- Zawaira, A; Hitchcock, G A *Primer For Mathematics Competitions* (2009)

- Write a summary of the key themes and arguments advanced in the above texts. If any particularly interest you, read further around the subject, perhaps browsing commentaries and articles (<http://scholar.google.co.uk> can be very useful for this).
- When reading books and articles, try to be very critical in your analysis at all times. Develop counter-arguments and attempt to justify these with logic and evidence.
- Sound maths skills are expected for all the courses you are considering, as they involve statistics. You can hone these skills by solving interesting maths problems and get help on:
  - NRICH: provides free mathematical games, problems and articles, and encourages students to share solutions; links with mathematicians who can help students solve problems at AskNRICH; and offers an online forum of students with similar interests <http://rich.maths.org/public/index.php>
  - Plus online magazine - <http://pass.maths.org.uk/>
  - Official website for STEP: <http://www.admissionstestingservice.org/our-services/subject-specific/step/about-step/>
  - Siklos, S T C *Advanced Problems in Mathematics* (1996 and 2003) (STEP-like problems) and *Advanced Problems in Core Mathematics* (see: <http://www.admissionstests.cambridgeassessment.org.uk/adt>)
  - Guide book to STEP: <http://www.maths.cam.ac.uk/undergrad/admissions/step/advpcm.pdf>
  - Oxford University's Bridging The Gap page is mainly aimed at year 13 students who have been accepted by Oxford to read for one of the Mathematics degrees, a joint school or Computer Science. It contains reading/exercises on key topics: <https://www.maths.ox.ac.uk/prospective-students/undergraduate/background>
  - Mathematical Consultant Dr Peter Mitchell's resources: <http://meikleriggs.org.uk/>
  - Cambridge University fellow Stephen Siklos' resources <http://www.damtp.cam.ac.uk/user/stcs/>, covering his research area in Classical General Relativity, STEP Examination help and examples, undergraduate admissions guidance, and documentation such as the Guide to the Mathematical Tripos, Guide for Supervisors, Study Skills in Mathematics and course descriptions, examples sheets and handouts from his current courses on Vector Calculus, Mechanics, Newtonian Dynamics and Further Complex Methods and guidance on applying to Jesus College to read mathematics