Applying for Maths at Oxbridge

Why Maths?

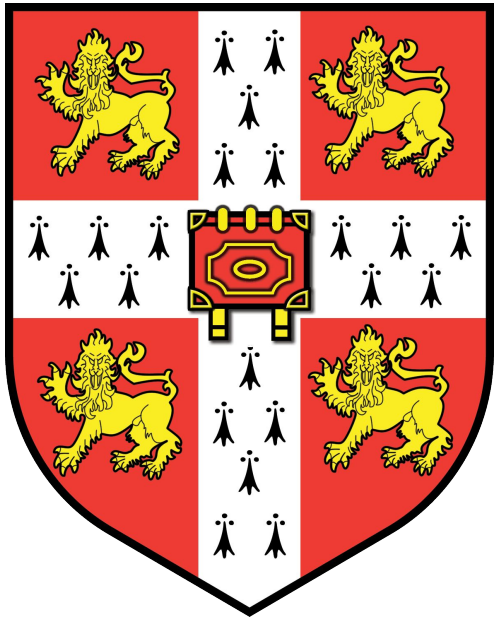
- You find maths interesting
- You’re good at maths
- You enjoy tackling challenging problems
- It leaves your career options open
- Maths graduates have very good job prospects

Oxford Application Process

- Apply through UCAS by 15th October 2017
- MAT (Mathematics Admissions Test) in early November
  - Registration Deadline: 15th October 2017
  - Mainly C1 and C2 modules from Maths A-Level
- Interviews in mid-December
- Offer letters in early January
- Standard Offer: A*(M) A*(FM) A
  - If you're only taking further maths to AS: A*(M) A A a (FM AS)
  - If you're not taking further maths: A*AA

Cambridge Application Process

- Apply through UCAS by 15th October 2017
- Complete SAQ (Supplementary Application Questionnaire)
- Interviews in December
- Offer letters in early January
- Take STEP along with A-Levels in June 2018
- Standard Offer: A*(M) A*(FM) A and 1,1 in STEP II and III)
    - Can give S,1 or S,S offers



Personal Statement

- Not too important for maths
- Oxbridge are more concerned about interviews
- You should show evidence of interest around the subject (i.e. extra reading)
- Perhaps explain something you learnt at school that you explored further in your own time or a particular topic/question you found interesting
- Mention Maths Challenges if you have done well in them
- Try to focus more on maths specific content as opposed to extra curricular activities (≈80:20)

Interviews

- Most applicants are invited to interviews (slightly more at Cambridge due to MAT at Oxford)
- Selection based on Year 12 UMS, personal statement, references, predicted grades and MAT (Oxford only)
- Cambridge: 2-3 interviews, 25-45 minutes, on one day (depending on your college)
- Oxford: 3+ interviews, ≈25 minutes, during residential stay over 3-5 days
    - 2+ interviews at college of choice and 1+ interview at another college
- Primarily doing interesting Maths questions with Professors and PhD students
- Interested in your thought process and how you approach unfamiliar questions

Interview Questions

- *Find* $f(x)$, *given that*:

$$f(x) = 1 + x\int_{-1}^{1} f(t^2)dt$$

- *Sketch* $y = xln(x)$ *and then sketch* $y = xln(\sin(x))$
- *Show that* $x^2 + y^2 \geq 2xy, \quad x, y \in \mathbb{R}$ *and then show further that*

$$p^4 + q^4 + r^4 + s^4 \geq 4pqrs, \qquad p, q, r, s \in \mathbb{R}$$

- *Prove that for any* $n \in \mathbb{N}$, *there exists* n *consecutive, composite* $(non - prime)$ *integers.*

STEP (Sixth Term Examination Paper)

- 3 different papers (STEP I, STEP II and STEP III)
- Cambridge offer usually of 1 in STEP II (based on A-Level Maths) and 1 in STEP III (based on A-Level Further Maths)
- Each paper is 3 hours long
- 13 questions, 3 sections (8 Pure, 3 Mechanics and 2 Stats questions on each paper)
    - Free to choose any questions from any sections
    - They don't care which section the questions are from - if you're more comfortable with pure you can only do pure, although this limits your question choice a lot
- 6 best solutions marked
- Graded U (Unclassified), 3 (Satisfactory), 2 (Good), 1 (Very Good), S (Outstanding)
- Grade 1 is usually 4 complete (not necessarily perfect) solutions
- Consider doing STEP I at the end of year 12 - looks good on your application if you get a good grade
- Examiners reports can be found online - reading them may be useful after trying questions

STEP Questions

(STEP II 1997

Q6)

Show that, if $\tan^2 \phi = 2\tan\phi + 1$, then $\tan 2\phi = -1$.

Find all solutions of the equation

$$\tan\theta = 2 + \tan 3\theta$$

which satisfy $0 < \theta < 2\pi$, expressing your answers as rational multiples of π.

Find all solutions of the equation

$$\cot\theta = 2 + \cot 3\theta$$

which satisfy

$$\frac{-3\pi}{2} < \theta < \frac{\pi}{2}.$$

[Ignore values of θ for which tan or cot is undefined.]

STEP Preparation Resources

- King's Factor
  - http://www.kcl.ac.uk/nms/depts/mathematics/about/KingsFactor/kingsfactor.aspx
- UCL STEP II and III course, talk to Ms Tumilty once you have an offer (You have to pay, but highly recommended)
- https://maths.org/step/welcome
  - Try STEP support modules before tackling STEP II and III if you find them useful as a way of getting into STEP type maths
- http://www.admissionstestingservice.org/for-test-takers/step/about-step/
  - STEP Specification
  - Past Papers & Solutions
  - Important Dates

More Support

Email us if you have any further questions or find us around school (form 13KOE, room 52)

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Topics/Maths/Important/STEP or Oxbridge Interview Questions:

(electronic version: http://goo.gl/9Jes0R)

- Siklos Booklets - worked solutions
- STEP Megapack - past papers and solutions (can maybe find a more up to date version on The Student Room)
- Past interview questions