

King's Student Perspectives Mathematics

Josh, 1st year

I'm from Alfington in Devon and I've just finished my first year studying Maths at King's.

Why did you choose to study Maths at Cambridge?

I wouldn't say that I really chose to study Maths at any point. It was simply my best subject and the one I most enjoyed all through school, so naturally if I was going to go to university, I would apply to do maths. Had that not been

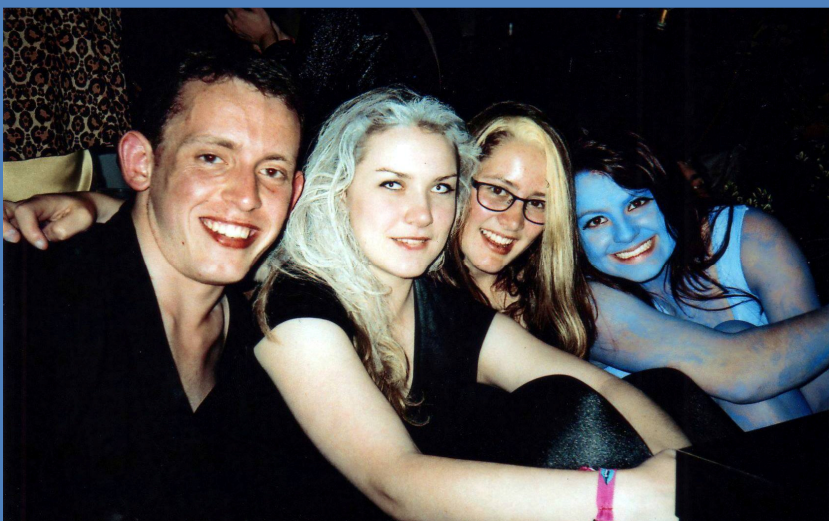
the case I would have seriously reconsidered applying to study at Cambridge, given how much time is spent studying here.

I chose Cambridge largely due to the fact that it is renowned as a world class university, especially in the sciences and mathematics, and because I thought that it would be a true challenge to get in and do well here (which I can confirm that it has been so far!).

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What was starting at King's like?

Starting at King's was a great experience. You meet many people and Freshers' Week is filled with activities designed to help you get to know them. Everyone was extremely friendly. What is more, given the relatively small number of people in each year, you don't have that annoying thing where you meet lots of people in the first few days who you never see again - so friendships form quickly here. It is important to make the most of the first week as everyone is new and probably just as nervous as you are. Once the work starts you'll miss it desperately!



Josh is on the left

The work begins quite quickly after Freshers' Week, and I personally stayed in the fresher's mindset for a little too long. Consequently I had a sudden build-up of work, which was quite overwhelming when I started to feel homesick and tired after Freshers' Week, so my advice is to try to avoid that if you can and be ready for the work to start.

How do you learn?

The material you cover at Cambridge comes from three directions: lectures, supervisions and self study.

Lectures take up twelve hours a week and are where you get the material for the year in the form of notes you make during each one (just copy absolutely everything down as clearly as possible). They are given by the faculty, so first years from all the colleges attend (or are supposed to).

Being in a fresh state for lectures can be a bit of a challenge. Whilst I managed not to miss a single lecture in my first two terms, I admit that there were many which I would rather have attended with an hour or two more sleep and less of a headache. This is part of being a student, but it does make things easier if you can get into good habits, especially for the exam term.

Supervisions are more individual teaching, given in two one-hour sessions per week, which you prepare work for and then have it critiqued by a supervisor from King's. More about those later.

Finally, and I would argue most importantly, is self study. You will not be able to rely on the lectures alone to understand the material and do the example sheets for supervisions. I made this mistake, and so really struggled to do the questions initially. I'd say that for every hour in a lecture, it actually takes me a further two hours in the library, although this will include working at example sheets.



King's library

and relaxing / eating / sleeping meant that I could put the stress of the work out of my mind far more easily at the end of the day and was also more productive when I was actually trying to work (you get some strange looks if you start watching 'Finding Nemo' in the library instead of working!).

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For my first two terms I worked exclusively in my own room, which with hindsight I do not recommend. Doing so can leave you pretty isolated, and working in either the bar, the college library, or with friends means that you don't end up as a recluse for large periods of time. Also, I found that having physically separate locations for work

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How do supervisions work?

Supervision teaching involves you and another student submitting answers to an example sheet the day before, and then spending an hour with a topic supervisor from King's reviewing and correcting the material. Supervision preparation work on example sheets is what you learn most from in the course, as this forms a significant proportion of your week.

You will be surprised at how quickly you improve here.

The supervisions themselves vary depending both on the supervisor and you own confidence and competence with the particular topic being discussed. I should say that I've been as nervous, if not more nervous, in quite a few supervisions than I was in my admissions interview, simply due to how thoroughly you work in supervisions and how much your understanding of the topic is explored when you work in detail, however you learn a lot from this process and it really brings any weaknesses you have to light so that you can work on them. The fact that you attend supervisions as a pair means that you also learn from each other as well as from your supervisor. Seeing somebody else's work can be helpful as well, as it often shows you how to improve you own (or maybe that's just me!).

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How is Cambridge different to school?

For me, the shift to having to be self motivated for university-level study was not so dramatic, as I had experience of teaching myself from the textbook ahead of time at school, as well as preparation I did for the STEP exams, both of which gave me a good starting point for working independently. The change in intensity of the workload was marked

however. Don't be surprised or dismayed if you feel quite stupid for protracted periods! As long as you keep up with deadlines this really is nothing to worry about, and you will be surprised at how quickly you improve here.

The difference in the style of maths at Cambridge is largely in the fact that the questions generally do not require you to get a numerical answer but to prove or disprove a statement. As a result, the need for clear working is paramount, and something which all of my supervisors suggested I improve at various points throughout the first year. The style of questions in example sheets and the end-of-year exams is far more like STEP questions than anything else.



King's back court, colourful with the setting sun

And the application process?

In the end, I found that the application process was actually not too bad. I was sent a couple of chapters from a book to read and learn (which I gather is no longer the policy) and then went to Cambridge in December for interview. I had an hour long test and a half hour interview. The test was not too bad. In my year it was nine questions long and you were simply told to do as much as you can in the time. I haven't spoken to anyone since who actually finished the whole thing. There was nothing beyond school-level knowledge involved, although it was unorthodox and required a certain amount of problem solving and creativity. The interview I had was very friendly and relaxed. Over the half hour I was given some maths questions to consider, which whilst challenging weren't too bad. The thing they are assessing, I think, is our ability to adapt to new unseen material.

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The main challenge for me was the STEP exams after I had my conditional offer. I started preparing for STEP before I had even been asked for interview, and doing so meant that I did almost all the past papers I could find online in preparation. This work was essential for me to be competent enough to do well in STEP, and it really developed me as a mathematician.

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STEP requires creative and organic thinking in tackling the questions which, whilst based entirely on the A-level syllabus, are far more challenging and not like anything you will have done in school before.

Despite preparing hugely for the STEP exams, the thing which completely blind-sided me personally was the effect that the immense pressure I felt had on me, given that both my university offers required a STEP grade. In the first exam, after a few questions I

hit a difficult part of a problem and completely lost confidence. The same thing happened during the second exam after a typo on the first question produced the same panicked response in me. As a result, I spent the summer waiting for results convinced that I hadn't got in. The marking is more generous than you may expect so I met my offer, and the experience left me far better prepared for the pressure of the Tripos exams, which are quite similar in style to STEP. I am sure that if I'd had a less dramatic experience in the STEP exams, I would have done far worse in my exams at the end of this year, when thinking under pressure was also required.

What about Cambridge life outside the Maths?

The social life here is good. You'll probably be spending more evenings in a library than out clubbing, but the idea that you won't have a good social life is completely false. The general attitude here is work hard, play hard. Being in a college is great, simply because whilst Cambridge is a very large university, it never feels like you are lost in a sea of people. King's in particular is small enough that you'll know most people in your year and see most of your



friends most days. Exam term is a bit of an exception as most things stop happening completely when everyone gets very busy, but afterwards lost time is more than made up for in May Week.

May Week is the final week of the year after all the exams are finished, when everybody relaxes and enjoys themselves after a very long year. There are all the Cambridge balls as well as a number of garden parties for colleges, societies and subjects. It is a great way to finish the year.

The two things which I have tried to commit to through out the year outside of my work are going to the university gym and training with the Cambridge University Royal Naval Unit or CURNU (website at <http://www.srcf.ucam.org/curnu/index.shtml>). Not much can really be said about using the gym other than how cathartic I find having a physical outlet can be, and how useful it is for relieving the stress of a busy workload. Being a member of CURNU, however, has been an important part of my university life thus far, and I hope to be far more involved with it next year. It has allowed me to meet a great number of people outside of my college and also at other universities, to develop further employable and useful skills of a different kind to the ones I develop through my degree, and to go on deployments and sea weekends aboard HMS Trumpeter. Other things worth mentioning are that you get paid for the training, and that they have the cheapest bar in Cambridge.

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What do you normally do during the vacations?

During the vacations I have a job at a local supermarket, which keeps me busy for the majority of the days and reduces any worries about the financial side of being at university. I also try to do some maths most days so as not to forget large portions of the course in what are very long holidays.

I have found that the pure courses are my favourite, as you feel that you are getting more in-depth knowledge than in some of the Applied courses.

Which of the first year papers did you enjoy most?

Analysis. It was my least favourite paper to begin with, but I drilled it over and over until it became the subject I did best in! Despite my expectations, I have found that the pure courses are my favourite, as you feel that you are getting more in-depth knowledge

than in some of the applied courses, in which have you take certain results or theorems on faith to a certain degree - something that I am not fond of doing.

Laying your work out poorly doesn't do anyone any favours, especially in the pure courses, where the method and working is the answer, not a means to an end.

What have you found difficult?

The main problem I encountered with the work was my poor presentation. Laying your work out poorly doesn't do anyone any favours, especially in the pure courses, where the method and working is the answer, not a means to an end. Following advice from my supervisors I have improved this though.

The other issue which I found challenging this year was a matter of confidence. After a rather caustic experience in my STEP exam, even though in the end the results turned out to be good, I had a large fall in

confidence over my ability to do mathematics, and starting a tough course at Cambridge wasn't the best way to build it back up! I would suggest that this is an experience that was not unique to me however. I am sure that this is something all new students go through, and maths has the disadvantage of having dichotomous answers, so the change can be quite painful. To be honest, I thought I was not at the right university until about a fortnight before the end of year exams. Now I would not want to be anywhere else. The material is very challenging and you will find it tough due to the fact that you will be constantly challenged by the work, supervisions and exams. Although it is tough, this struggle is important though – I think that you come out at the other end better able to work and learn in the way that you need to here. I did well in the exams at the end of first year so it is worth being aware that such struggles are a normal part of the process and do not mean that Cambridge somehow admitted you by mistake.

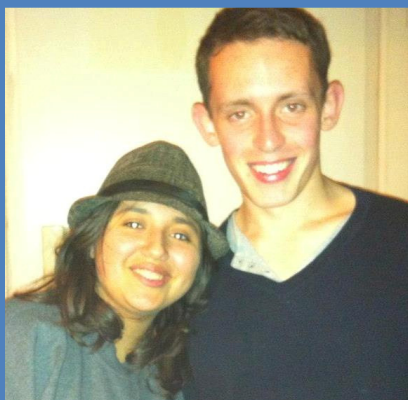
What advice would you give to sixth formers about to apply?

Firstly, if your going to apply you really have to love doing maths. If not, you will spend a lot of your time doing something you really aren't so keen on and it will be nearly impossible to motivate yourself to put in the required hours. If you do love maths then it's certainly worth a shot.

When I applied, I had never done exceptionally well in the UKMT (United Kingdom Maths Trust Competitions: <http://www.ukmt.org.uk/>), and had never done anything other than school work in maths. I felt that maybe I was overreaching in applying to Cambridge, given some of the applicants I knew and their backgrounds. However, if you can get through STEP then there

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is no reason why you can't do well at Cambridge if you are willing to work. So I advise sixth formers to just be overly familiar with your school material and you should be okay.



As for good books to read, I would suggest "How to think like a mathematician" by Kevin Houston. It's a very useful guide to some of the basic ideas you need when starting at Cambridge.

What are you looking forward to next year?

Just generally getting back to the grind and seeing all my uni friends again.

A note to current King's Mathematicians

If you would like to write about your experiences of studying Mathematics at King's for our prospective students to read, please email Kristy in the Admissions Office for further details: undergraduate.admissions@kings.cam.ac.uk