Freshers' Preparation for Mathematics

Starting to study Mathematics at Oxford should be exciting, but may also be a little daunting. There are two things you can and should do to prepare yourself.

The first concerns A-levels or other courses you may have taken. Depending on the syllabus that you have followed, you may have studied a variety of pure mathematics, mechanics, statistics or decision mathematics. When you arrive you will need to be comfortable with basic techniques of mathematics, and in particular we want you to be familiar with "core" pure mathematics.

There are eleven problem sheets designed to help you to do this. They are posted on the web at:

https://www.maths.ox.ac.uk/study-here/undergraduate-study/practice-problems

You should aim to do all these problems before you arrive, and you should also look at the more advanced problem sheets available at the same web page. This web page also has information about the joint honours courses Mathematics & Statistics, Mathematics & Computer Science, and Mathematics & Philosophy.

We may go through some of the problems in tutorials, and we may set some work at the beginning of term on these or similar problems.

If you want help with these problems, you may find the book "Mathematical Techniques" by D.W. Jordan and P. Smith (4th edition, 2008, Oxford University Press) useful. The problems closely follow the chapters in this book, but you should not feel obliged to purchase a copy. Many students find that they quickly outgrow it.

Online notes for a "Bridging the Gap" course aimed at the transition from school to university mathematics are available at:

https://www.maths.ox.ac.uk/study-here/undergraduate-study/bridging-gap

Another book that includes much of the same material, and also far more, that is likely to remain useful during your degree, is "Mathematical Methods for Physics and Engineering" by K.F. Riley, M.P. Hobson and S.J. Bence (3rd edition, 2006, Cambridge University Press). Again, you should not feel obliged to purchase a copy of this book. The February 2018 Kindle edition is currently very inexpensive, but the formulae are so badly typeset that we recommend you avoid it.

The second thing to do is to get some idea of what it will be like to study mathematics at Oxford using the resources at:

https://www.maths.ox.ac.uk/study-here/undergraduate-study/mathematics-university/welcome-mathematical-institute

A document called "How do undergraduates do mathematics?" is available at:

https://www.maths.ox.ac.uk/system/files/attachments/study_public_0.pdf

Read carefully part I, and as much as you can of part II

Chapter 2 of this document gives you some idea of what it is like to study pure mathematics at university level, which is rather different from what is called pure mathematics at school. We will shortly send you a book "How to Think about Analysis" that contains lots of excellent advice about studying pure mathematics at university level, especially the study of functions, called analysis, that makes up roughly half of the first year pure mathematics curriculum. We strongly encourage you to read Part 1 of this book before arrival. There is quite a lot of overlap with the author's other book "How to Study for a Mathematics Degree", recommended at one of the above links, so it is probably not useful to read both.

Finally, the first year of the Mathematics and Mathematics and Statistics courses (though not other joint honours courses) involves some computational projects using a software package called MATLAB. We can arrange for you to borrow a laptop during the classes, but if you have a Windows, Mac, or Linux laptop, you will be able to install MATLAB (at no cost) once you are registered with the University IT Services. You can find detailed requirements for operating system versions etc at:

https://uk.mathworks.com/support/sysreq.html

We suggest you do not bring a Chromebook. It is not straightforward to install Linux and MATLAB on an Intel or AMD-based Chromebook, and not possible on an ARM-based Chromebook. There is a web-based interface to MATLAB that could be used from a Chromebook, but most people find it awkward to use.

We look forward to seeing you in October!

Paul Dellar and Pier Palamara   August 2018