

Preface

Mathematics has always been an exciting challenge for both of us. Even before university, we thoroughly enjoyed getting to grips with calculus and meeting stuff like vectors and mechanics for the first time. The only problem that we both found when we first started our degrees was that amongst our new peers, different people had very different mathematical backgrounds. Some had done “single maths,” some “double,” and some an entirely different syllabus altogether. We quickly learned that a mathematics degree requires mastery of a whole range of ideas: including those that you haven’t studied before.

The aim of this book is in no way to teach you everything that you would learn in the first year of a mathematics degree. Instead, our aim was to write a book that you could read before going to university that would give you a solid foundation on which to build all of the new skills that you will acquire. That way, when you actually arrive at university you will have much more time for all of the other amazing things that being a student offers, rather than having to spend hours looking up something that you could easily learn in a few minutes from a straightforward book like this. To this end, we have included an appendix of loads of formulae and identities so that you can spend your nights partying rather than searching in the library for the integral of $\tan x$.

I suppose being young means being radical, so we’ve written this book backwards. Not crazy, “read in the mirror” backwards, but the chapters are set out in the reverse of what you are probably used to seeing. Each chapter is designed to be a completely stand-alone entity, and chapters always *start* with some questions. Our reason for doing this is so that if you see a chapter title about something with which you are familiar, you can dive straight into some questions then head off to the next chapter without having to read any explanation of the topic. If you really want to fly through the material, the

first ten “Test Yourself” questions of each chapter are designed to cover the key points. If you can score close to full marks on these, you’re doing pretty well. If what the questions are asking looks foreign to you, work through the chapter and the rest of the exercises and come back to these last. All being well, you’ll be able to do them within a reasonably short time. If you have already studied a lot of “pre-university” maths, you may well have a good knowledge of quite a few of the earlier chapters’ contents. If you haven’t, there will obviously be more chapters where you’ll be starting afresh. For those readers taking the International Baccalaureate (or any other equivalent qualification) the key to success is exactly the same – study what you need to, pass over what you don’t. In any case, the latter chapters move further away from school and college mathematics and towards degree-style thinking, so as the book progresses there is certainly something for everyone.

Please don’t ever be disheartened if you’re finding some things difficult. We wrote this book in the hope that it could help prepare you as fully as possible for your studies, so that you can have the best time at university, both in terms of academic achievement and your student life as a whole. There may be times when you would like more practice with a new skill, and so we thoroughly recommend that in these instances you search out some more questions to do, either from the Internet or from other books.

On the whole, we hope that regardless of whether you are a student who has just decided to study maths further, or you are someone just about to set off to university, this book will serve you well as a single, cohesive guide that draws on your knowledge thus far and helps shape it so that you are ready to tackle the challenges of the mathematics ahead.

Martin Gould and Edward Hurst



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Hurst, E.; Gould, M.

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