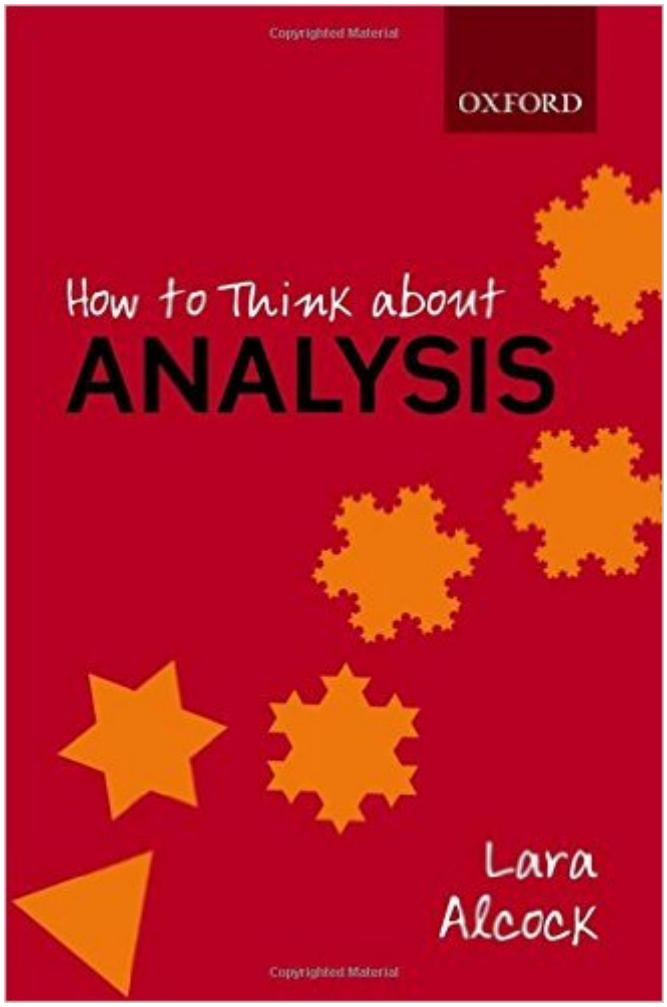
How To Think About Analysis



Synopsis

Analysis (sometimes called Real Analysis or Advanced Calculus) is a core subject in most undergraduate mathematics degrees. It is elegant, clever and rewarding to learn, but it is hard. Even the best students find it challenging, and those who are unprepared often find it incomprehensible at first. This book aims to ensure that no student need be unprepared. It is not like other Analysis books. It is not a textbook containing standard content. Rather, it is designed to be read before arriving at university and/or before starting an Analysis course, or as a companion text once a course is begun. It provides a friendly and readable introduction to the subject by building on the student's existing understanding of six key topics: sequences, series, continuity, differentiability, integrability and the real numbers. It explains how mathematicians develop and use sophisticated formal versions of these ideas, and provides a detailed introduction to the central definitions, theorems and proofs, pointing out typical areas of difficulty and confusion and explaining how to overcome these. The book also provides study advice focused on the skills that students need if they are to build on this introduction and learn successfully in their own Analysis courses: it explains how to understand definitions, theorems and proofs by relating them to examples and diagrams, how to think productively about proofs, and how theories are taught in lectures and books on advanced mathematics. It also offers practical guidance on strategies for effective study planning. The advice throughout is research based and is presented in an engaging style that will be accessible to students who are new to advanced abstract mathematics.

Book Information

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Customer Reviews

I’m hesitant to even review this small book. The text is plainspoken to the point of, at times, sounding comical. At one point, the author does seem to define a differentiable function as one thatâ ™s â œeverywhere not-pointy.â • Yes, she does note that we sacrifice mathematical sophistication in so doing, but we might argue that we stop doing mathematics entirely in so doing, or even that we stop doing (what some might say is the same thing) anything logical at all. What exactly does not-pointy mean? Some things look pointy, but when you get closer, youâ ™ll see that actually the point isnâ ™t so pointy after all, but kind of round. So maybe what the author wants is â œeverywhere not-pointy, no matter how close up you get?â • So we could define differentiability as â œeverywhere not-pointy no matter even if get closer than any given epsilon?â • Hey, thereâ ™s got to be a better way, and that way is called mathematical rigor. One merit of learning analysis is that weâ ™re being introduced, often for the first time, to this mathematical rigor. We begin asking â œexistentialâ • questions, such as â œdoes the derivative even exist, and if not, for what class of mappings?â • The reason Iâ ™m hesitant to go on, is that this book is essentially a set of sidebars to mathematical rigor, telling us in excruciating detail the correct way to denote sequences (so they look â œprofessional,â • not kidding), and how an analysis class will proceed, and what your teacher will expect of you. So this is a crib book about how to get yourself through an analysis course without having a nervous breakdown. Good deal, if it does that for you. My concern is that such an approach brings with it the collateral damage ofâ ”well, ensuring that you never do really learn anything about the real-analytic foundations of the calculus.

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