Book review - Zbl 06351381

How to Think about Analysis
Alcock, Lara
Oxford University Press, 2014
xvii, 246 p., $ 14.99
ISBN 978-0-19-872353-0/pbk

This volume is intended not as a textbook, but as an aid for the student struggling with undergraduate real analysis. Written from the standpoint of mathematics education and psychology, it is concerned more with the feelings and attitudes of students than with the subject matter. As such, this praiseworthy effort is warmly and fluently written. It could, however, reinforce negative attitudes, since it is based more on superficial, tedious, and distracting repetition, than on the underlying beauty of the subject.

Only the simplest of proofs are given; some are unduly extended and over-complicated, perhaps in an attempt to drive home the methods, while others are so over-simplified as to be less than convincing. There is often a confusion between the existence of a number with a certain property, and the selection and naming of one such. At times, a constant is suddenly viewed as a function.

This book is intended for remedial work in college, for students with very poor high school training, who are somehow forced to study a subject not to their liking. There is no mention of any effective, parallel efforts in solving the root cause of the problem, if that lies in the high school.

The Preface, written for instructors, states that
"... this book focuses ... on strategies for understanding definitions, theorems, and proofs, rather than for solving problems or constructing proofs. I realize that ... I risk offending mathematicians ..."

Indeed, it does seem likely that many mathematicians, especially those trained in the last century, will not be in agreement with this approach. One traditionally held view is that the mathematical portion of a general education promotes clear thinking and problem-solving abilities, and that these abilities are of great value for a free citizenry.

Topics covered include most of the main ideas of undergraduate single-variable real analysis. There are plentiful and excellent drawings to illustrate the various topics. The mathematics is fairly rigorous, although there is a predilection for proofs by contradiction, where direct proofs would suffice. The constant use of the phrase "if and only if" in definitions may, for poorly trained readers, obscure the distinction between definitions and theorems.

This book, attractively formatted and printed, in handbook style, will likely do no great harm, and may help certain students in certain situations.

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February 3, 2015