possible with functions rather than with their values. The reviewer will risk saying that all sensible men are by now convinced of the necessity for (i). About (ii) controversy still exists, and this book clearly exemplifies the difficulties in carrying it out correctly.

For example, on p. 123 the book states, after the theorem on differentiation of a product:-

COROLLARY. Let $c \in \mathrm{Dom}\ g$ and let $Dg(c)$ exist. Then for any real number k, $D\underset{\sim}{k}g$ exists and

$$D\underset{\sim}{k}g = \underset{\sim}{k}Dg.$$

[Here c denotes a number, g a function, D the operation of differentiation, $\underset{\sim}{k}$ the constant function whose value is k.]

The c in the hypothesis is irrelevant to the conclusion. There are a few other logical slips of about the same magnitude. For example, $\int f$ is defined to be a certain set of functions, and the formula

$$\int f + \int g$$

is used without any definition for sums of sets of functions.

Once such errors have been corrected, the true test of a book like this is a practical one: can students in fact learn from it. And the best way to find this out is to try it.

H.A. Thurston, University of British Columbia

<u>A first course in abstract algebra</u>, by John B. Fraleigh. Addison-Wesley Publishing Co., Reading, Massachusetts. xvi + 447 pages. $9.75.

A glance through the chapter headings of this book shows that it is an unusual "first course in abstract algebra". The book covers groups, rings, and fields and apart from the usual material that might be contained in an elementary textbook on these subjects we find the following topics: finitely generated abelian groups, factor groups, Jordan-Holder Theorem, Sylow Theorems, Free groups, homology groups, Brouwer Fixed-Point Theorem, geometric constructions, Galois Theory, insolvability of the quintic. However, one subject only lightly touched upon is the theory of Vector Spaces and Linear Transformations.

Apart from this the list reads more like a complete undergraduate syllabus in Algebra and so it is clear that the author must have departed considerably from the standard method of presenting the subject. He saves space and time in two ways, mainly by omitting the proofs of many of the theorems but also by glossing over a lot of the set theoretic details such as equivalence relations etc.

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Because of this unusual outlook it is impossible to attempt any appraisal of this book without actually using it with students so we will simply mention some points about it.

The author states his case in the preface. "It is my feeling that in view of the vast body of mathematics, it is important to train the student to understand and use established results without feeling that he must first carefully check every detail of the proofs. Of course, professional mathematicians have been doing this for years." This outlook is justified in many cases. For example, the proof of Sylow's first theorem does not throw any light on the theorem itself. It does not "convince" the student that the theorem is true, nor does it throw any light on "why" the theorem is true. However, the position is different with some other theorems. The proof of the Fundamental Theorem of Finitely Generated Groups is more constructive in that it actually gives a method for finding a basis and the invariant factors of a given group.

Another point is that I have usually found it unwise to present the student with too many concepts during a single course. By the time he has been introduced to groups, rings, fields, integral domains, vector spaces, algebras, Euclidean domains etc, he is unlikely to have a clear idea of any of them. It takes time to absorb anything.

If this book is used as a text it would seem that the student would get only a superficial view of the topics studied, but this is balanced by the fact that he would know about many more important things than would otherwise be the case. The individual instructor must make up his own mind about this.

A first course in Algebra often has another use. If this is the first time that the student has come across abstract mathematics, then it may be used as an occasion to introduce rigorously such set theoretic topics as functions, relations, etc., and to get the student really familiar with these concepts. Professor Fraleigh has generally skipped over such things but the instructor could easily fill in the details himself. Perhaps a supplementary text could be used.

The book is well written, easy to understand and contains many examples. Among the latter we may mention Exercise 16.1 which asks the student to show that every composite group of order less than 60 is not simple. The author has worked out the hardest cases in the text.

Peter Lorimer, University of Auckland

Quasi-uniform topological spaces, by M.G. Murdeshwar and S.A. Naimpally. Series A: Preprints of Research Papers. No.4, vol. 2. (Février 1966). Nordhoff. $2.00 (Stechert).

André Weil généralisa la notion d'espace métrique en créant le concept d'espace uniforme, devenu un outil précieux de l'Analyse Moderne.

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