Introduction to modern abstract algebra, by D.M. Burton. Addison-Wesley, Reading, Massachusetts, 1967. vii + 310 pages. $3.95.

The general content of this book is what one would expect. There are four chapters: the first is devoted to the usual preliminaries, and the remaining three to groups, rings, and vector spaces respectively.

Chapter II seems, unfortunately to be the worst. The author's style is dry and uninspiring at the best of times, and in this chapter the student is expected to introduce himself to abstract thinking by 110 pages of group theory culminating in the Jordan-Holder Theorem and the Sylow Theorems. It would seem to the reviewer that such theorems could be postponed and some more intuitive concepts, such as the direct product (which is relegated to the exercises) introduced and used to prove some worthwhile structure theorems. The chapter (and indeed the whole book) is not helped by the cumbersome and over-pedantic notation. For example, multiplication in groups is usually denoted by $*$, while multiplication in factor groups is denoted by $\times$. (We were relieved, however, at the statement in Chapter 4:" In the sequel a vector space over the field $(F, +, .)$ will be denoted merely by $V(F)$ rather than the correct but cumbersome notation $(((V, +), (F, +, .), .)$".

The chapter on rings is quite standard. There is some elementary field theory and a section on Boolean rings and algebras (including the Stone representation theorem).

The last chapter, on vector spaces, is introduced through the algebra of matrices (which he proves is a simple ring). This is used as a model of a vector space. The general theory of vector spaces is then developed, for the most part with no restriction on dimension. For example, the existence of a basis is shown using Zorn's lemma. The uniqueness of the cardinality of a basis is shown only in the finite-dimensional case.

The whole book is rigorous and clearly written, and Chapters III and IV seem to be quite good. However, there seems to be little to recommend it over the several excellent texts already available which treat the subject at the same level.

R.V. Moody, New Mexico State University

Foundations of the calculus, by H.F. DeBaggis and K.S. Miller. Saunders, 1966. $5.00.

This book deals with differentiation and (Riemann) integration and their prerequisites (limits, etc.) following the footsteps of Karl Menger, and in particular using his notation in which j denotes the identity function. This approach involves (i) clearly distinguishing between a function f and a typical value $f(x)$ thereof and (ii) working as far as

https://doi.org/10.1017/S0008439500029246 Published online by Cambridge University Press

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 $c \in \text{Dom } g$ 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

A first course in abstract algebra, 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.