College Algebra, by A. Adrian Albert. The University of Chicago Press, Chicago, 1963. 278 pages. $1.95 (Paperback).

In many colleges and universities, the traditional course in College Algebra is taught by graduate assistants, if it is taught at all. One of the reasons for the reluctance of senior faculty members to teach the course is the lack of discipline and organization in the standard textbook. Any mathematician will find it a genuine pleasure to teach from this reprinting of Professor Albert's book.

In the preface the author states: "College Algebra has a basic unity. It should consist of a study of the number systems of elementary mathematics, polynomials and allied functions, algebraic identities, equations, and systems of equations. The unity of the present text is achieved by fitting the standard topics of College Algebra into this pattern." Indeed the standard topics are covered and, one finds, for example, sections in the text on: factorials, permutations and combinations, logarithms, the binomial theorem, arithmetic and geometric progressions, quadratic equations, the remainder and factor theorems, Descarte's rule of signs, and Horner's method.

A feature of the text is the inclusion of topics which could be included in an expansion of the standard course. Among these are: the euclidean greatest common divisor process for both integers and polynomials, the unique factorization theorem for polynomials, and two chapters on matrices and quadratic forms.

This book can serve as good preparation for a course in modern algebra; the material is presented with care and rigor, and the student is not introduced to ideas which he will have to unlearn at a later date. [The g.c.d. of two integers is defined (p. 40) as their largest positive common divisor. This differs from the definition in Birkhoff and MacLane where a g.c.d. of two integers is defined as (p. 17) a common divisor which is a multiple of every other common divisor.] The prospective calculus student will also be well served by the numerous drill exercises, including a substantial number of oral exercises.

A review of the first edition of the book can be found in the American Mathematical Monthly, March, 1947, pages 174-175.

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Algèbre noethérienne non commutative, by L. Lesieur et R. Croisot. [Mém. Sci. Math. 154] Gauthier-Villars, Paris 1963. 117 pages.

The success of the ideal theory in commutative rings with either ascending (Emmy Noether) or descending (Emil Artin) chain conditions

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has naturally led to attempts at extending the theory to the non-commutative case. The situation becomes naturally much more complicated: left ideals and right ideals have to be considered in addition to two-sided ideals; there are different possible generalizations of the radical, and of prime ideals and primary ideals; and there are, in particular, the secondary and tertiary ideals introduced in 1956 by the authors in order to elucidate the lattice structure of the set of (left or right or two-sided) ideals in a non-commutative noetherian or artinian ring. The tract under review contains a clear exposition of the theory, with particular emphasis on the lattices involved; proofs are frequently sketched or even given in full. The theory is developed simultaneously for rings, algebras over a field, and semigroups. There is a useful bibliography, listing 69 items up to 1961, and an index of terminology.

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Principles of Abstract Algebra, by Richard W. Ball. Holt, Rinehart and Winston Publishers, 1963. ix + 290 pages. $6.00.

The author's avowed aim is to present to college students an introduction to algebra in the spirit of the "new wave" high school texts. To achieve this object, he approaches the subject from a semi-axiomatic point of view and uses a style which is always explicit rather than concise. There are ample illustrative examples and exercises.

In the first part of the book, the domain of integers is introduced as a familiar set, which is then described through some of the axioms it satisfies. Well-ordering is postulated and used to derive the usual divisibility properties. Elementary group theory is developed to the point where it can be applied to prove the Fermat-Euler theorem in residue class rings.

The second half of the book considers the algebraic and (briefly) the analytic properties of the field of complex numbers and its subfields. Divisibility properties of polynomials over an arbitrary field are derived. Rolle's theorem and Descartes' rule of signs are stated (the fundamental theorem of algebra is "postulated") and their application to isolating the roots of real polynomials is discussed. The book concludes with a brief discussion of matrices (without determinants) and the solution of linear equations.

The book is clearly written and, within its own limitations, it might be considered for a course requiring a more gentle introduction to algebra than that of Birkhoff and MacLane.

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