13 [7.50].—THEODORE J. RIVLIN, *The Chebyshev Polynomials*, John Wiley & Sons, Inc., New York, 1974, vi + 186 pp., 24 cm. Price $15.95.

This short monograph is an elegant presentation of most of what is known and interesting about the Chebyshev polynomials $T_n(x)$. The presentation appears leisurely in spite of the amount of material presented due to the careful organization of the material. The book contains four chapters as follows: Chapter 1 has basic definitions, then treats interpolation at the zeros and extrema of $T_n(x)$ and finishes with orthogonality properties. Chapter 2 gives the minimax approximation and extremal properties of $T_n(x)$. This chapter is divided into two distinct parts and each viewpoint is developed naturally from first principles. The result is compact introductions to Chebyshev approximation theory and the maximization of linear functionals. The theme of Chapter 3 is the use of expansions of functions in a series of $T_n(x)$. This material introduces many ideas and methods of numerical analysis and approximate computations. The final short Chapter 4 shows that $T_n(T_m(x)) = T_{nm}(x)$ (i.e. the Chebyshev polynomials are closed under composition) and develops the consequences of this.

The book is written so as to be useful as a text and there are over two hundred exercises. These vary from easy to difficult and also serve to present many facts without lengthening the text. The primary use of this book is as a reference for the working applied mathematician and numerical analyst. It gathers together, as no other book does, the variety of material that one needs from time to time in the analysis of approximate methods or the search for counterexamples. A brief survey of the related literature (or, at least, a more complete bibliography) and a more detailed index would have enhanced its value in this respect.

The book is recommended as a welcome and unique addition to an applied mathematics library.

J. R.

14 [8.00].—J. LAURIE SNELL, *Introduction to Probability Theory with Computing*, Prentice-Hall, Inc., Englewood Cliffs, N. J., 1975, x + 294 pp. Price $8.95 paperbound.

This is an introductory course in probability theory, with major emphasis on computer simulations and applications. The level is quite elementary; for instance, only finite probability spaces are considered. As each new concept is introduced, the student is presented with a simple computer program and sample run illustrating the concept. Thus, after only a few pages of preliminaries, the five-line program "RANDOM" is introduced, showing how to generate twenty random numbers. Such computer generated random numbers are the tool for illustrating stochastic phenomena throughout the remainder of the book. By the next page the student learns how to generate a sequence of outcomes of coin tossing, and before the course's end one can simulate the arc sine distribution of fluctuation theory and the ergodicity of a regular finite Markov chain. All programs are written in the language BASIC, with actual run printouts immediately following the program listings. Needless to say, the text will only be effective in conjunction with access to a computer facility equipped with BASIC. Also, a certain familiarity with the language (which may be acquired in a few hours) is a prerequisite. To a certain extent, though, the student is able to learn program writing skills concurrently with the theoretical material.

Chapter 1 contains the basic framework and terminology of probability, some elementary combinatorics, then conditional probability. Among the computer applications are numerical solutions to the famous "birthday" and "hat check" problems. In

Chapter 2 the author introduces random variables, expectation and variance. The important notion of a martingale is also given, and illustrated with a simple "stock market" model. Chapter 3 deals with limit theorems, but only by approximation to finite range experiments. The discussion includes the weak law of large numbers, central limit theorem and arc sine law. Each is illustrated with illuminating computer graphics and several simulations. Key ideas, e.g. Chebyshev's inequality and the reflection principle, are discussed, but details of proofs are often omitted. The final chapter gives the basic theory of finite Markov chains, culminating in the limit theorem for regular chains. The text is complemented by many problems, of greatly varying difficulty, often involving the writing of a BASIC program.

The book constitutes a novel approach to elementary probability theory, which should appeal to students and teachers interested in a computer oriented perspective. The tenor of the discussion is casual, with an emphasis on ideas rather than formalities. The computer simulations add a dimension of tangibility to the subject matter, a dimension often lacking in the modern, abstract approach to mathematics.

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15 [**4.10.4, 5.05.4, 5.10.3, 5.15.3, 5.20.4**].—J. R. WHITEMAN, *A Bibliography for Finite Elements*, Academic Press, Inc., London, New York and San Francisco, 1975, 26 cm. Price $9.25.

16 [**4.00, 5.00**].—R. ANSORGE, L. COLLATZ, G. HÄMMERLIN & W. TÖRNIG, Editors, *Numerische Behandlung von Differentialgleichungen*, International Series of Numerical Mathematics, Birkhäuser Verlag, Basel, Switzerland, 1975, 355 pp., 25 cm. Price approximately $18.00.

The volume contains papers presented at a meeting organized by R. Ansorge, L. Collatz, G. Hämmerlin and W. Törnig. This meeting took place at the Mathematical Research Institute at Oberwolfach, Germany from June 9–June 14, 1974.

J. B.

17 [**2.05**].—L. COLLATZ & G. MEINARDUS, Editors, *Numerische Methoden der Approximationstheorie*, Band 2, International Series of Numerical Mathematics, Birkhäuser Verlag, Basel, Switzerland, 1975, 199 pp., 25 cm. Price approximately $14.00.

This volume contains papers presented at a meeting organized by L. Collatz and G. Meinardus. This meeting took place at the Mathematical Research Institute at Oberwolfach, Germany from June 3–June 9, 1973.

J. B.

18 [**9**].—G. SCHRUTKA v. RECHTENSTAMM, *Tabelle der (Relativ)-Klassenzahlen der Kreiskörper deren ϕ-Funktion des Wurtzelexponenten (Grad) nicht grösser als* 256 *ist,* Deutschen Akad. Wiss. Berlin, Abhandlungen, Kl. Math. Phys. Tech., 1964, No. 2, 64 pp.

This remarkable work, a labor of some twenty-eight years, has apparently gone unreviewed and unnoticed for more than a decade. It is an extension of a small table of H. Hasse [1] which in turn is an elaboration of an original work of E. Kummer [2] on cyclotomic fields.

As the title indicates, it covers fields and subfields generated by $\exp(2\pi i/f)$ whenever Euler's $\phi(f) \leqslant 256$. The tables of Kummer and Hasse are for $f \leqslant 100$. Schrutka