REVIEWS AND DESCRIPTIONS OF TABLES AND BOOKS

69[A, J, L, M].—I. M. Ryshik & I. S. Gradstein, *Summen-Produkt- und Integral-Tafeln: Tables of Series, Products, and Integrals*, VEB Deutscher Verlag der Wissenschaften, Berlin, 1957, xxiii + 438 p., 27 cm. Price DM56.

This volume of tables consists of a translation of the Russian third edition [1] into parallel German and English text. That edition has now been improved and augmented by the incorporation of corrections listed on a sheet of corrigenda accompanying the third edition, the addition of supplementary remarks in the Appendix, and the inclusion of an extensive supplementary bibliography, which consists of books and monographs pertaining to integral transforms, special functions, and indexes of mathematical tables.

The preparation of the third edition was carried out by I. S. Gradstein, following the death in the Second World War of I. M. Ryshik, who was responsible for the first two editions. A description of the contents of the first edition has appeared in a detailed review by R. C. Archibald [2].

The present book represents an extensive revision of the earlier editions. Major changes include the deletion of sections relating to the calculus of finite differences (including formulas for numerical quadrature), the addition of a completely new chapter on integral transforms, and the enlargement of the chapters on special functions.

Information on each of the special functions—in particular, elliptic, cylindrical, and spherical—is presented systematically. Such information generally includes definitions; representation by integrals, series, and products; asymptotic formulas; functional equations; special values; and theorems relating to characteristic properties.

An introductory section entitled "On the Arrangement of the Formulae" explains the arrangement of the contents of the chapters on elementary functions and on their definite integrals, and sets forth innovations in the arrangement of definite integrals, which in previous editions followed closely the classification established in the classical tables of Bierens de Haan [3].

The usefulness of this volume is enhanced by references and cross-references for the sources of most of the 5400 formulas presented. Formulas are numbered decimally within each chapter, and the chapter numbers are used for the integer part, as is customary. Furthermore, a key for the references to the literature cited on p. 434 is described in the Preface. It seems appropriate to note here that in both the Russian third edition and in this translation the list of numbered references consists of 40 items, although reference is made in several places in the book to a forty-first item and a forty-second that were apparently omitted inadvertently.

The first two editions contained a table of 10D approximations to $(2n - 1)!!/(2n)!!$ and $(2n - 1)!!/(2n)!!(2n + 1)$, for $n = 1(1)15$, and to $(2n - 1)!!/(2n + 2)!!$ and $(2n - 1)!!/(2n + 2)!!(2n + 3)$, for $n = 1(1)14$. This numerical information is now supplemented by an original table of the Lobatschefsky function $L(x)$ to 7D for $x = 0°(1°)10°$, 6D for $x = 11°(1°)30°$, and 5D for $x = 31°(1°)90°$, computed by N. V. Tomantovaîa under the supervision of B. L. Laptev. This function is briefly discussed (p. 296–297) in the chapter on special functions. Additional numerical data also include exact values of the first 17 Bernoulli numbers and the first 10 Euler numbers, 10D approximations to $\zeta(n)$ for $n = 2(1)11$, and Euler's constant and Catalan's constant to 16D and 9D, respectively. I have examined all these data carefully, and the errors detected, together with errors in the formulas, are enumerated separately in this issue (MTE 293).

Use of the book is facilitated by an elaborate index of special functions and notations on p. 417–422. In addition to supplementary remarks and the bibliographies already mentioned, the Appendix contains (on p. 423–429) a discussion of the variations in the notation and symbols used for special numbers and functions throughout the mathematical literature and a concise list of abbreviations (p. 432–433).

The lucid expository style employed throughout is exemplified in the Introduction. Here, a systematic summary of definitions and theorems relating to infinite products and infinite series of various types supplements the list of relevant formulas. Similar explanatory text serves as introduction to several of the subsequent chapters and their subdivisions.

Typographical errors found in the text are minor and do not detract from the intelligibility of the textual material. The typography, especially in a compilation of such a large number of formulas, is uniformly excellent, and the appearance of the book is attractive. Professor Archibald's opinion that the first edition was "undoubtedly of considerable value for any mathematician to have at hand" certainly holds true for this latest version.

J. W. W.

1. I. M. Ryz͡hik & I. S. Gradshteĭn, *Tablit͡sy Integralov, Summ, Ri͡adov i Proizvedeniĭ*, [Tables of Integrals, Sums, Series and Products], The State Publishing House for Technical and Theoretical Literature, Moscow, 1951.
2. R. C. Archibald, **RMT** 219, *MTAC*, v. 1, 1943/45, p. 442.
3. Bierens de Haan, *Nouvelles Tables d'Intégrales Définies*, Leyden 1867. Reprinted by G. E. Stechert & Co., New York, 1939.

70[G].—Eugene Prange, *An Algorism for Factoring $X^n - 1$ over a Finite Field*, AFCRC-TN-59-775, U. S. Air Force, Bedford, Mass., October 1959, iii + 20 p., 27 cm.

An algorism is given for factoring $X^n - 1$ over the finite field F_q of q elements. This can be of use in constructing another finite field over F_q, in constructing a linear recursion of period n over F_q, or in constructing cyclic error-correcting group codes. The algorism has two parts: Step 1, the construction of the multiplicative identities of the minimal ideals of $F_q[X]/[X^n - 1]$; Step 2, the use of these idempotents in the construction of the irreducible factors of $X^n - 1$.

Author's Abstract

71[G].—M. Rotenberg, R. Bivins, N. Metropolis & J. K. Wooten, Jr., *The 3-j and 6-j Symbols*, The Technology Press, Massachusetts Institute of Technology, Cambridge, Massachusetts, 1960, viii + 498 p., 29 cm. Price $16.00.

Wigner's 3-j symbol is closely related to the Clebsch-Gordan coefficients used in the coupling of angular momenta. If $\mathbf{J}_1$ and $\mathbf{J}_2$ are coupled to give $\mathbf{J}$, with j, j_1, j_2 as the total-angular-momentum quantum numbers and m, m_1, m_2 as the quantum