REVIEWS AND DESCRIPTIONS OF TABLES AND BOOKS

The numbers in brackets are assigned according to the American Mathematical Society classification scheme. The 1980 Mathematics Subject Classification can be found in the December index volumes of Mathematical Reviews.

2[65A05].—A. P. PRUDNIKOV, YU. A. BRYČKOV & O. I. MARIČEV, *Integrals and Series of Special Functions* (Russian), "Nauka", Moscow, 1983, 749 pp., 22 cm. Price 4 Rubles, 20 Kopecks.

Only two years after the publication of their volume of integrals and sums of elementary functions [1], reviewed in [2], the authors now present a 749 page collection of formulas for integrals and sums of special functions. The main part of the volume is divided into five chapters, and each chapter is divided into many sections and subsections. As in [1], the notation is standard, and knowledge of Russian (required for the few short sections of text) is not essential. Chapter 1 (54 pages) deals with indefinite integrals, including integrands involving incomplete gamma functions, the exponential integral, the error functions, Fresnel integrals, different types of Bessel and Hankel functions, and orthogonal polynomials; as well as products of these functions with powers, logarithms, and exponential functions. The very long Chapter 2 (562 pages) consists of definite integrals. This chapter is very impressive, and many of the formulas it contains seem to have been compiled for the first time. It is divided into sections for integrands containing the gamma function, the psi function, the Riemann zeta function, the exponential integral, ordinary and hyperbolic sines and cosines, error functions, Fresnel integrals, incomplete gamma functions, parabolic cylinder functions, ordinary and modified Bessel functions (very extensive), Hankel functions, and Legendre, Laguerre, Hermite, Gegenbauer, and Jacobi polynomials. Many integrands contain several of these functions, often in combination with elementary functions, and depend on a certain number of parameters. Results are frequently given as infinite series or as hypergeometric functions ${}_pF_q$, which may limit their practical applicability in certain cases. Chapter 3 (18 pages) contains double, triple, and some multiple integrals; in particular, many involving products of Bessel functions with exponential functions or powers. Chapter 4 (11 pages) gives finite sums; in particular of (ordinary and modified) Bessel functions, and of Legendre, Laguerre, Hermite, Gegenbauer, and Jacobi polynomials. Sums involving products of these polynomials are also given. Chapter 5 (73 pages) contains an extensive compilation of infinite series; in particular, series involving incomplete gamma functions, the Riemann zeta function,

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sine and cosine integrals, real and complex error functions, parabolic cylinder functions, ordinary and modified Bessel functions, and the orthogonal polynomials mentioned above.

There are two short appendices. The first (2 pages) contains formulas for the binomial coefficients and the Pochhammer symbol, and the second (21 pages) contains formulas for some of the special functions; in particular, formulas for the mth derivative (with respect to the argument z) of products of certain elementary functions (powers and exponentials) with orthogonal polynomials having z, or elementary functions (reciprocal, square root) of z, as arguments. Two dictionaries of notation complete the work. There is a list of 37 references, but no direct references are given in any formulas. This is a disadvantage if one wants to know how a formula may be derived or if one suspects an error. Also, some important references are not included in the list.

The printing and binding are very satisfactory. This table is certainly one of the most important reference books for mathematicians, physicists, engineers, and others working in fields where such formulas are likely to occur. Especially in view of its reasonable price, this table, and its companion volume on elementary functions [1], ought to be available in the library of every institute. Unfortunately, the number of copies printed (22 thousand, 70 thousand for [1]) is rather small, and the table is difficult to obtain (almost impossible for [1]). There are reports that an English translation is in preparation.

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1. A. P. PRUDNIKOV, YU. A. BRYČKOV & O. I. MARIČEV, *Integrals and Series of Elementary Functions* (Russian), "Nauka", Moscow, 1981.
2. Y. L. LUKE, Review of [1], *Math. Comp.*, v. 40, 1983, pp. 413–414.

3[65L15, 65M00, 65N00, 65P05, 76-02, 76-04].—MAURIZIO PANDOLFI & RENZO PIVA (Editors), *Proceedings of the Fifth GAMM-Conference on Numerical Methods in Fluid Mechanics*, Rome, October 5–7, 1983, Friedr. Vieweg & Sohn, Braunschweig/Wiesbaden, 1984, viii + 390 pp., 23 cm. Price $32.00.

This volume contains the 48 contributed papers presented at the conference in the title. In addition, there are four short reports on GAMM workshops held at various places from 1980 to 1982.

W.G.