

BOOK REVIEWS

The Probability Integral. By W. F. Sheppard. Cambridge, University Press, 1939. 11 + 34 pp.

This book contains six tables of values of functions related to the function $(2\pi)^{-1/2} \int_x^\infty e^{-t^2/2} dt$, and was published for the British Association for the Advancement of Science. It is the seventh volume of the series of mathematical tables published by the British Association. The tables may be described as follows:

Table I. The ratio of the tail area of the normal curve to its bounding ordinate, with reduced derivatives, at intervals of one-hundredth of the standard deviation, to twelve decimal places.

Table II. The ratio of the tail area of the normal curve to its bounding ordinate, with reduced derivatives, at intervals of one-tenth of the standard deviation, to twenty-four decimal places.

Table III. The negative natural logarithm of the tail area of the normal curve, for integral multiples of the standard deviation, to twenty-four decimal places.

Table IV. The negative natural logarithm of the tail area of the normal curve, with reduced derivatives, at intervals of one-tenth of the standard deviation, to sixteen decimal places.

Table V. The common logarithm of the tail area of the normal curve, with reduced derivatives, at intervals of one-tenth of the standard deviation, to twelve decimal places.

Table VI. The common logarithm of the tail area of the normal curve, with second central differences, at intervals of one-hundredth of the standard deviation, to eight decimal places.

By the n th reduced derivative of a function $f(x)$ is meant the expression $h^n f^{(n)}(x)/n!$, and in the tabulations the value chosen for h is the argument interval. Thus accurate interpolation is made possible by the use of the Taylor expansion. The number of reduced derivatives given for each entry varies from 3 to 16.

There is an introduction, by J. O. Irwin, which explains the use of the tables clearly. The Introduction also states that the idea of preparing such a volume of tables was originally conceived by the late Dr. Sheppard, who had in mind a set of tables which would form the basis of the computation of the probability integral "to as many decimal places as would ever be required." The work was not completely finished by Sheppard; the reduced derivatives in Table II, and all of Table VI, were computed by individuals appointed by the Committee for the Calculation of Mathematical Tables of the British Association. All the tables have been checked.