7.1 ("A set of functions of a single variable are linearly related if and only if their wronskian vanishes") shows that the author intended to define what are usually called linearly dependent functions, since Theorem 7.1 would be true if the word "related" were replaced by "dependent," but is *not* true for the definition given, namely, "we shall say that four functions $f_1(x), f_2(x), f_3(x), f_4(x)$ are linearly related if there exist four *nonzero* [emphasis supplied by the reviewer] quantities c_1, c_2, c_3, c_4 independent of x such that $c_1f_1 + c_2f_2 + c_3f_3 + c_4f_4 = 0$". The word *nonzero* should, of course, be replaced by the phrase *not all zero*. Incidentally, "Wronskian" is usually capitalized.

Neither in Ch. VIII nor elsewhere was the reviewer able to discover the author's definition of the phrase "nonprojective transformation". Yet Ch. VIII, based largely on a paper by Gronwall (ref. 5 in the bibliography), has the phrase as its title. The reviewer was also unable to discover the phrase anywhere in Gronwall's paper, from which Theorem 8.1 (concerned with nonprojective transformation) is stated to have been taken.

The reviewer suggests that a worked example involving at least one scale with a curved support would have been appropriate for Ch. II. On p. 23, for equation (2.25) it would have been better to define the units in which the various physical quantities are measured. On p. 83, "antiparallel" should be defined. The reviewer doubts that a reader with merely a knowledge of the calculus would be able (as seems to be implied in the preface) to understand adequately the material of Chapters VII and VIII, even if these chapters were error-free. It is also suggested that too much may have been left as an exercise for the reader in several places.

In conclusion, the reviewer suggests that the unsophisticated reader follow the suggestion made in the preface that Chs. I, II, III, V, and VI form an elementary text. Ch. IV seems to be relatively elementary also. The sophisticated reader should go to the original papers of Kellogg and Gronwall, on which Chapters VII and VIII are respectively based.

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38[X].—ALEXANDER S. LEVENS, *Nomography*, 2nd edition, John Wiley & Sons, New York, 1959, vii + 296 p., 25 cm. Price $8.50.

Professor Levens' *Nomography* is judged by this reviewer to be an excellent elementary textbook. It reflects the author's mastery of pedagogic technique. This work should lead the student to more than the acquisition of a theoretical knowledge of nomography—it should enable him to become a skilled and experienced nomographer. To develop the requisite skill, the text abounds with realistic problems, taken in many cases from practical engineering or physical situations.

The geometric approach in this book is both simple and direct. Perhaps some will find the text overly simple in parts, with too many explicit steps. However, it is likely that most students will appreciate its clarity and ease of reading.

After a brief introduction and a careful discussion of functional scales, the author divides the study into various nomogram types, which are taken up serially. The geometry of each general type is thoroughly discussed and fully illustrated with a detailed application. The geometric approach in this text is considered to be a far better introduction to nomography than an analytical approach by the theory of determinants. Basic analytic theory is not neglected, however, and a chapter on determinants is included near the end.

The second edition is considered a definite improvement over the first; it has a more pleasing format and type arrangement and an over-all attractiveness that gives it more pedagogic appeal. (One minor defect: chapter numbers on the top of each page of the first edition were unaccountably omitted in the second edition.)

Besides numerous text revisions, important new material appears in the second edition. Most significant are: (a) the expansion of the chapter on determinants, (b) the addition of a chapter on projective transformations, and (c) the addition of a chapter indicating the relationship between concurrency and alignment nomograms (with applications to experimental data, including a description of the rectification of experimental curves).

An appendix supplies an assortment of nomographic solutions to different problems taken from various technical fields, and offers fine illustration of available techniques.

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39[X, Z].—Lyle R. Langdon, *Approximating Functions for Digital Computers.* Reprinted from *Industrial Mathematics* v. 6, 1955, p. 79–100.

This article is concerned with several methods for determining approximations to functions of one real variable. The methods mentioned include the use of Padé approximants, a modification of the Taylor expansion said to be due to Obrechkoff, the use of Chebyshev polynomials to economize truncated power series in the sense of Lanczos, the use of a rational interpolant which collocates $f(x)$ at five points, as well as some special devices based on a study of the particular function to be approximated.

The following approximations are given:

Function	Nature of approximation	Range of x	Stated upper bound for error
$\sin x$	Rational	$-\pi \leqq x \leqq \pi$	6×10^{-9}
$\cos x$	Rational	$-\pi \leqq x \leqq \pi$	1×10^{-9}
$\tan x$	Rational	$-\pi/4 \leqq x \leqq \pi/4$	7×10^{-8}
e^x	Rational	$-\pi \leqq x \leqq \pi$	1 unit in signifi[illegible] digit
$\sqrt{x}$	Rational	$0.1 \leqq x \leqq 10.0$	Something in 5th significant digit
$\sin \frac{\pi x}{2}$	Polynomial	$-1 \leqq x \leqq 1$	4×10^{-9}
$\cos \frac{\pi x}{2}$	Polynomial	$-1 \leqq x \leqq 1$	7×10^{-9}