The authors overemphasize the ordered-pair definition of a function. We do not, when teaching fractions in kindergarten, tell the children that a rational number is an equivalence-class of ordered pairs of integers, true though this may be, and proud though we may be of knowing it. Similarly, the beginner in calculus needs to know the following fact about a function: that to define _f_ adequately we must say, for each _x_, whether or not f(x) is defined, and, if so, what it is; but the underlying ordered-pair construction is, at elementary level, a distraction, especially when it leads to the following clumsy definition of derivative.

After defining $f'(x_1)$ in the usual way, the authors continue:

> "The derivative of the function _f_ given by $y = f(x)$ is the function f' consisting of the ordered pairs $(x, f'(x))$ for all values of _x_ in D [the domain of f] at which _f_ has a derivative as defined in the first part of this definition."

But these points are details: no book is perfect, and this one is, taken all in all, one of the best at its particular level. The diagrams, in particular, are excellent.

Hugh A. Thurston, University of British Columbia

<u>A Course of Mathematical Analysis</u>, by A. F. Bermant. Macmillan Co. of Canada, 1963. Vol. I: xiv + 493 pages. $11.00. Vol. II: xi + 374 pages. $10.00.

This is a translation of the second (revised) edition of a book designed for use in higher technical schools in Russia. Its Eastern provenance obtrudes itself when we find ourselves reading, in the introduction, a quotation from Engels, "The Cartesian <u>variable</u> represented a turning-point in mathematics. Thanks to this, <u>motion</u> and <u>dialectic</u> made their appearance in mathematics."

The first chapter, on functions, is longer and more thorough than usual, classifying functions into explicit and implicit, algebraic and transcendental, single-valued and many-valued; giving a definition of "elementary function"; considering oddness and evenness, symmetry, inverses, linearity and periodicity.

Limits are defined in terms of "infinitesimals" and "infinitely large magnitudes", and lead to theorems about the bounds of a continuous function in a closed interval, and the uniformity of this continuity. Differentiation is motivated not only by velocity, but also by linear density and specific heat (a good point, in the reviewer's opinion). The weakness of the treatment by infinitesimals and differentials is shown when the formula for arc-length of the curve $y = f(x)$ is found without apparently requiring continuity of $f'(x)$. Investigation of

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functions and curves includes an application to Van der Waals' equation for a gas. The chapter on the indefinite integral is long and thorough and contains an interesting practical simplification of the method of partial fractions due to M. V. Ostrogradskii. The chapters on definite integrals and series contain no surprises.

The second volume deals in similar vein with functions of several variables, differential equations, and Fourier series.

There are no exercises.

Hugh A. Thurston, University of British Columbia

Differential Equations, A Modern Approach, by Harry Hochstadt. Holt, Rinehart, and Winston, Inc., New York, Toronto, London, 1963. viii + 294 pages.

This is highly recommended as a textbook for a third or fourth year honours course on ordinary differential equations. The book could be used for a first course on the subject for students with two years of Calculus and some experience with linear algebra. All the necessary background material on the latter is included in a preliminary chapter. The viewpoint is refreshingly modern, in contrast with dozens of other recent books at this level. The stress is consistently on ideas and theory rather than tricks and special substitutions. There is a good selection of exercises, a useful bibliography, and an adequate index.

Linear systems of differential equations are treated first, with emphasis on equations with constant coefficients, analytic coefficients, and regular singularities. Among the many novel features is a treatment of asymptotic expansions of solutions about singular points. Boundary value problems are introduced early and emphasized, and integral equations are mentioned. A chapter is included on equations with periodic coefficients, a speciality of the author. The last two chapters deal with nonlinear systems, including stability theory with a brief introduction to Lyapunov's direct method, periodic systems, limit cycles, the Poincaré index, and perturbation theory.

C. A. Swanson, University of British Columbia

Methods in Analysis, by Jack Indritz. Macmillan Co. (New York), Collier-Macmillan Canada Ltd. (Toronto), 1963. x + 476 pages.

This is one of several recent books intended to bridge the gap between an Advanced Calculus course and the sort of mathematics courses required to give a thorough insight into the theory of the linear