NOW AVAILABLE:

A Splendid Assortment of Polish Mathematical Serial Publications

ACTA MATHEMATICA

★

ANNALES POLONICI MATHEMATICI

★

STUDIA MATHEMATICA

★

FUNDAMENTA MATHEMATICAE

★

MATHEMATICAL MONOGRAPHS

These titles feature original works by Polish scientists dealing mainly with mathematical functions, analysis and probability calculus.

Orders and information:

ARS POLONA

Foreign Trade Enterprise
Krakowskie Przedmiescie 7
WARSAW, Poland
Cable: Arspolona Warsaw

MATHEMATICAL SURVEYS

Published by

THE AMERICAN MATHEMATICAL SOCIETY

Volume	*List Price*
1. J. A. Shohat and J. D. Tamarkin, *The problem of moments*, 1943; reprinted 1960, xiv, 144 pp.	$5.80
3. Morris Marden, *The geometry of the zeroes of a polynomial in a complex variable*, 1949, x, 183 pp.	5.00
4. O. F. G. Schilling, *The theory of valuations*, 1950, viii, 253 pp.	6.00
5. Stefan Bergman, *The kernel function and conformal mapping*, 1950, viii, 161 pp.	4.00
6. C. C. Chevalley, *Introduction to the theory of algebraic functions of one variable*, 1951, xii, 188 pp.	4.00
7. (1) A. H. Clifford and C. B. Preston, *The algebraic theory of semigroups*, 1962, xvi, 224 pp.	10.60

The price to members of the American Mathematical Society is 25% less than list

Order from

AMERICAN MATHEMATICAL SOCIETY

190 Hope Street
Providence 6, Rhode Island

Journals Published by the

American Mathematical Society

Soviet Mathematics—Doklady

SOVIET MATHEMATICS—DOKLADY is a translation journal containing the entire pure mathematics section of the DOKLADY AKADEMII NAUK SSSR, the Reports of the Academy of Sciences of the USSR. The DOKLADY presents short articles, averaging 3 to 5 pages, covering current research in all fields of pure mathematics. Issued bimonthly in January, March, May, July, September, and November.

Domestic subscriptions, $17.50; foreign subscriptions, $20.00.

Single issues are $5.00. Vols. 1, 2, and 3 (1960–1962), price per volume $30.00.

Mathematical Reviews

This journal is devoted to abstracts and reviews of the current mathematical literature of the world. Two volumes of MATHEMATICAL REVIEWS will be published in 1963, Volume 25 and Volume 26. Each volume will consist of 6 regular issues plus an index issue. In each regular issue the abstracts and reviews are grouped under subject headings. Publication began in 1940.

Prior to 1961 it appeared in eleven single issues. Orders for complete volumes only are accepted. Volumes 1–24 are available at the following prices: Vols. 1–16 (1940–1955), $42.00 each; all other volumes $50.00.

Notices of the American Mathematical Society

This journal announces the programs of the meetings of the Society. It carries the abstracts of all contributed papers presented at the meetings of the Society and publishes news items of interest to mathematical scientists.

The subscription price is $7.00 per annual volume of seven numbers. A single copy is $2.00. Orders for back volumes (back issues of the last two years only are available) are $14.00 per volume.

All communications should be addressed to the Editor, 190 Hope Street, Providence 6, Rhode Island. News items and insertions for each issue must be in the hands of the editor on or before the deadline for the abstracts for the papers to be presented in the meetings announced in that issue. These deadlines are published regularly on the back of the title page.

Mathematics of Computation

A journal devoted to original papers in numerical analysis, the application of numerical methods and high-speed calculator devices, the computation of mathematical tables, the theory of high-speed calculating devices and other aids to computation. In addition it publishes reviews and notes in these and related fields. Published by the Society for the National Academy of Sciences-National Research Council.

The subscription price is $8.00 per volume of 4 issues. Single copies are $2.50. *Back issues* insofar as they are available: (1943–1962) $3.00 per issue; $12.00 per volume. Write for specific information concerning availability.

Chinese Mathematics—Acta

This is a cover-to-cover translation into English of Acta Mathematica Sinica published by Academia Sinica Peking, People's Republic of China. Acta Mathematica Sinica contains current research in all fields of pure mathematics. Subscription price per volume $20.00.

Volume 1, 1962 of the translation (corresponding to Volume 10, 1960 of the original) contained three issues. Volume 2, 1963 (corresponding to Volume 11, 1961 of the original) will have four issues. It is planned to publish also Volume 3 of the translation (corresponding to Volume 12 of the original) during the year 1963. In each case the translation will have the same number of issues as the original.

Vol. 1 (1962), $30.00.

Journals Published by the

American Mathematical Society

Bulletin of the American Mathematical Society

This journal is the official organ of the Society. It reports official acts of the Society and the details of its meetings. It contains some of the officially invited addresses presented before the Society, reviews of advanced mathematical books, research problems and a department of research announcements.

The subscription price is $7.00 per annual volume of six numbers.

Research Problems and Invited Addresses offered for publication should be sent to WALTER RUDIN, Department of Mathematics, University of Wisconsin, Madison, Wisconsin; Book Reviews to FELIX BROWDER, Department of Mathematics, Yale University, New Haven, Connecticut. Research Announcements offered for publication should be sent to some member of the Council of the Society, and communicated by him to E. E. MOISE, Graduate School of Education, Harvard University, Cambridge 38, Massachusetts. All other communications to the editors should be sent to the Managing Editor, E. E. MOISE.

The members of the Council for 1963 are: H. A. Antosiewicz, P. T. Bateman, Lipman Bers, R. P. Boas, H. W. Bode, Raoul Bott, Felix Browder, S. S. Chern, P. E. Conner, C. W. Curtis, D. A. Darling, J. L. Doob, G. F. D. Duff, Eldon Dyer, William Feller, A. M. Gleason, J. W. Green, P. R. Halmos, G. A. Hedlund, M. H. Heins, L. A. Henkin, Edwin Hewitt, A. S. Householder, G. B. Huff, G. A. Hunt, Nathan Jacobson, P. D. Lax, Karel de Leeuw, R. C. Lyndon, H. P. McKean, Jr., L. Markus, W. S. Massey, A. E. Meder, Jr., E. E. Moise, Deane Montgomery, G. D. Mostow, Louis Nirenberg, R. S. Pierce, Everett Pitcher, R. S. Phillips, Alex Rosenberg, Walter Rudin, I. M. Singer, J. D. Swift, Michio Suzuki, C. B. Tompkins, W. R. Wasow, J. V. Wehausen, George Whaples, J. W. T. Youngs, Daniel Zelinsky, Leo Zippin, Antoni Zygmund.

Proceedings of the American Mathematical Society

This journal is devoted entirely to research in pure and applied mathematics and is devoted principally to the publication of original papers of moderate length. A department called Shorter Notes was established for the purpose of publishing very short papers of an unusually elegant and polished character, for which there is normally no other outlet.

The subscription price is $11.00 per annual volume of six numbers.

Papers in algebra and number theory should be sent to ALEX ROSENBERG, Department of Mathematics, Cornell University, Ithaca, New York or GEORGE WHAPLES, Department of Mathematics, Indiana University, Bloomington, Indiana; in probability, real variables, logic, and foundations to P. R. HALMOS, Department of Mathematics, University of Michigan, Ann Arbor, Michigan; in abstract analysis to either P. R. HALMOS or ALEX ROSENBERG; in geometry and topology to ELDON DYER, Eckhart Hall, University of Chicago, Chicago 37, Illinois; in other branches of analysis, applied mathematics, and all other fields to M. H. HEINS, Department of Mathematics, University of Illinois, Urbana, Illinois or FRITZ JOHN, Courant Institute of Mathematical Sciences, 4 Washington Place, New York 3, New York. All other communications to the editors should be addressed to the Managing Editor, ALEX ROSENBERG.

Transactions of the American Mathematical Society

This journal is devoted entirely to research in pure and applied mathematics, and includes in general longer papers than the PROCEEDINGS.

Four volumes of three numbers each will be published in 1963. The subscription price is $8.00 per volume.

Papers in analysis and applied mathematics should be sent to LIPMAN BERS, Courant Institute of Mathematical Sciences, New York University, New York 3, New York; in topology to W. S. MASSEY, Department of Mathematics, Yale University, Box 2155, Yale Station, New Haven, Connecticut; in algebra, number theory, and logic to DANIEL ZELINSKY, Department of Mathematics, Northwestern University, Evanston, Illinois; in geometry and abstract analysis to I. M. SINGER, Department of Mathematics, Massachusetts Institute of Technology, Cambridge 39, Massachusetts; in statistics and probability to H. P. MCKEAN, JR., Department of Mathematics, Massachusetts Institute of Technology, Cambridge 39, Massachusetts. All other communications to the editors should be addressed to the Managing Editor, W. S. MASSEY.

CONTENTS—*Continued from back cover*

Hsin Chu and M. A. Geraghty. The fundamental group and the first cohomology group of a minimal set 377
D. A. Buchsbaum and D. S. Rim. A generalized Koszul complex 382
Hiroshi Kunita and Takesi Watanabe. Markov processes and Martin boundaries 386
Robert McKissick. A nontrivial normal sup norm algebra .. 391
Bernard Maskit. On a conjecture concerning planar coverings of surfaces 396
C. D. Papakyriakopoulos. A reduction of the Poincaré conjecture to other conjectures. II 399
E. S. Rapaport. On a problem of Papakyriakopoulos 402
C. T. Yang. The triangulability of the orbit space of a differentiable transformation group 405
F. B. Fuller. Periodic trajectories of a one-parameter semigroup 409
Daihachiro Sato. On the rate of growth of entire functions of fast growth 411
J. B. Diaz and F. T. Metcalf. Stronger forms of a class of inequalities of G. Pólya-G. Szegö, and L. V. Kantorovich .. 415
Takayuki Tamura. Examples of direct products of semigroups or groupoids 419
M. F. Atiyah and I. M. Singer. The index of elliptic operators on compact manifolds 422

CONTENTS

May, 1963

Invited Addresses

H. L. Royden. Function algebras 281
R. L. Vaught. Models of complete theories 299
J. S. MacNerney. A linear initial-value problem 314

Book Review

D. Morgenstern and I. Szabó. Vorlesungen über theoretische Mechanik. Reviewed by C. Truesdell 330

Research Problems

M. Slater. Number theory 333
Richard Bellman. Analysis 333
The Annual Meeting in Berkeley 334
The February Meeting in New York 341

Research Announcements

Mario Petrich. The maximal semilattice decomposition of a semigroup 342
F. V. Atkinson. Boundary problems leading to orthogonal polynomials in several variables 345
M. W. Hirsch. Obstruction theories for smoothing manifolds and maps 352
Ramesh Gangolli. Isotropic infinitely divisible processes on compact symmetric spaces 357
R. H. Rosen. Polyhedral neighborhoods in triangulated manifolds 359
D. G. Cantor. Power series with integral coefficients 362
E. L. Lima. Commuting vector fields on 2-manifolds 366
Reikichi Yoshida. On some semi-groups 369
Lee Neuwirth. A topological classification of certain 3-manifolds 372
E. Michael. The product of a normal space and a metric space need not be normal 375

Continued on inside back cover

GEORGE BANTA COMPANY, INC., MENASHA, WISCONSIN