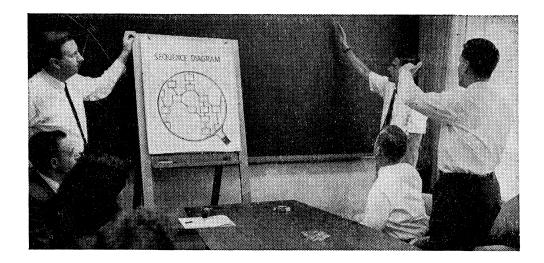
at IBM.



PROGRAMMERS shape the future of a new technology

IBM programmers, with professional associates in research, development, and manufacturing, are contributing expert knowledge and ideas in the creation of future computing systems.

This teamwork represents a striking advance in the role of the programmer and dramatizes the important part being played by this young but rapidly growing profession. At IBM, programmers are creating new concepts in software and contributing to the design of new systems for virtually every phase of business, science, and industry.

IBM progammers at all levels are establishing newstandards of achievement in designing programs to simulate business and industrial operations. They are developing systems for government projects in space, defense, and communications, where their data processing skills will help produce significant advances in tomorrow's computer technology. They are also studying the complex programs for...information-handling systems...scheduling methodology...information-retrieval studies.

IBM programmers also face challenging tasks in developing new programming systems. For example, they are devising programs that in turn use machine capability for formulating new programs. They are creating programs that enable computers to diagnose their own faults through self-checking. And they are working on systems that will let scientists and engineers "talk" to machines in the everyday language of science and engineering.

Programmers at IBM take pride in their professional status and enjoy the unusual opportunities offered by a leader of the computer industry. In an atmosphere so receptive to new ideas, their concepts flourish with IBM's full resources. They can contribute significant accomplishments, recognized throughout the field.

Openings for programmers exist throughout the U.S. IBM is an Equal Opportunity Employer. If you have experience in computer programming and would like to have more information about careers with IBM, we'd like to hear from you. Please write to:

Manager of Professional Employment IBM, Department 529R 590 Madison Avenue New York 22, New York



A SECOND COURSE IN NUMBER THEORY

By H. Cohn, University of Arizona. With a main objective of bridging the gap between the Eighteenth Century and current work being done, this work gives a coherent treatment of the background, main theory and applications of number theory. 1962. 276 pages. \$8.00.

STOCHASTIC SERVICE SYSTEMS

By JOHN RIORDAN, Bell Telephone Laboratories. This book gives a concise summary of mathematical methods and developments appearing in the study of service systems of stochastic (probabilistic) character. 1962. 139 pages. \$6.75.

THE THEORY OF GRAPHS AND ITS APPLICATIONS

By CLAUDE BERGE, Centre National de Recherche Scientifique. This is for mathematicians, who will find a branch of the theory of sets which may be applied in many different situations—and for specialists in other fields, providing them with a combinatorial method both simple and effective. 1962. 247 pages. \$6.50.

REPRESENTATION THEORY OF FINITE GROUPS AND ASSOCIATIVE ALGEBRAS

By Charles W. Curtis, University of Wisconsin, and Irving Reiner. A self-contained account, including background material on groups, modules, and algebraic number theory. Pure and Applied Mathematics—Volume XI. An Interscience Book. 1962. Approx. 672 pages. Prob. \$17.00.

FOURIER ANALYSIS ON GROUPS

By WALTER RUDIN, University of Wisconsin. Interscience Tracts in Pure and Applied Mathematics, Volume 12. An Interscience Book. 1962. Approx. 314 pages. Prob. \$9.50.

LINEAR OPERATORS, Part II

By Nelson Dunford and J. T. Schwartz, both of Yale University. Pure and Applied Mathematics, Volume 7. An Interscience Book. 1962. In Press.

DIOPHANTINE GEOMETRY

By SERGE LANG, Columbia University. An Interscience Book. Ready in September. Approx. 224 pages. Prob. \$6.75.

Send for examination copies

JOHN WILEY & SONS, Inc.

ADVANCED ENGINEERING MATHEMATICS

By ERWIN KREYSZIG, The Ohio State University. A balanced treatment of mathematics theory with applications to engineering and physics. Ready in August. Approx. 784 pages. Prob. \$11.75*

PARTIAL DIFFERENTIAL EQUATIONS

By R. COURANT, Institute of Mathematical Sciences, New York University. Volume II of the classic COURANT-HILBERT: Methods of Mathematical Physics. A self contained treatment of partial differential equations. An Interscience Book.* 1962. 850 pages. \$17.50*

MATHEMATICS FOR THE PHYSICAL SCIENCES

By HERBERT S. WILF, University of Illinois. A selection from seven mathematical disciplines. 1962. Approx. 296 pages. \$7.95*

LIE ALGEBRAS

By NATHAN JACOBSON, Yale University. A text on lie algebra, with the usual algebraic concepts and material on linear algebra. An Interscience Book. 1962. 344 pages. \$10.50

LINEAR ALGEBRA AND GEOMETRY

By NICHOLAS H. KUIPER, Agricultural University, Wageningen, Netherlands. Treats such topics as affine plane, classification of endomorphisms, quadratic and symmetric bilinear functions etc., in a clear, consistent way. 1962. 286 pages. \$8.25

REPRESENTATIONS OF GROUPS**

By H. Boerner, Justus Liebig Hochschule, Giessen. An Interscience Book. 1962. In Press.

CALCULUS OF VARIATIONS

By L. A. Pars. 1962. In Press.

- * Also available in a textbook edition for college adoption.
- ** A North-Holland Book.

Send for examination copies.

440 Park Avenue South, New York 16, N.Y.

ROUGH.

FOR fought.
policy n.
military c.
of weapons:

NATIONAL

DEFENSE Mil.
sh.
task o.
MITRE h.
done. And there is room at M.
In the area of mathemati.
experienced men in Sta.
Mathematical Linguistics,
Probability Phory, Game Theory, In.
Artificial Intelligenc.
Simula.

If you feel you can advance this nev.
urged to write to Vice President — Techn.
The MITRE Corporation,
Dept. BE3, Bedford, h.
Openings are also available in Wash
and Colora.

'independent, composit corporewith — not in competition
Typ. Formed under the sponhard with Force Electronic State
Transcalled in Wash
and Colora.

'Independent, composit corporewith — not in competition
Typ. Formed under the sponhard under the





Assignments of High Professional Stature with the Nation's Foremost Rocket Research Laboratory

Applied Mathematicians

Explore these opportunities with Hercules Powder Company at Allegany Ballistics Laboratory

ADVANCED DESIGN RESEARCH - BS, MS

Perform trajectory and ballistics studies and complete mission analyses. Supply mathematical analyses for design studies in advanced propulsion systems. Must be able to work independently, generate and analyze new ideas.

DATA PROCESSING / TESTING - BS, MS

Work with other groups on analysis of acquired range data, program administration, and solution of scientific problems. Prepare calculation systems for programming complex data into IBM 7070 computer.

ANALYSIS GROUP, POLARIS DIVISION - MS, PhD

Perform advanced mathematical analysis on propulsion systems. Involves such areas as gas dynamics, thermodynamics, internal ballistics, structural stress. 5-10 years experience required.



Forward your written inquiry in confidence to Dr. W. R. Lowstuter

HERCULES POWDER COMPANY

INCORPORATED

ALLEGANY BALLISTICS LABORATORY, CUMBERLAND, MARYLAND

All qualified applicants will receive consideration for employment without regard to race, creed, color, or national origin.

U.S. CITIZENSHIP REQUIRED

Journals Published by the American Mathematical Society

Soviet Mathematics-Doklady

This journal contains the entire pure mathematics section of the DOKLADY AKADEMII NAUK SSSR in translation. It appears six times a year, each bimonthly issue corresponding to one volume of the SOVIET DOKLADY. (The DOKLADY AKADEMII Nauk SSSR is issued three times a month, six issues constituting a volume.)

Rates per annual volume are as follows: Domestic subscriptions, \$17.50; foreign subscriptions, \$20.00. Single issues are \$5.00.

Mathematical Reviews

This journal contains abstracts and reviews of the current mathematical literature of the world. It is sponsored by thirteen mathematical organizations, located both in the United States and abroad.

The publication of MATHEMATICAL REVIEWS was begun in 1940. Starting in 1961, it appears monthly, in two parts. Prior to 1961 it appeared in eleven single issues. Orders for complete volumes only are accepted. Volumes 1–21 are available at the following prices: Vols. 1–16 (1940–1955), \$42.00 each; all other volumes \$50.00. In 1962, it will be published in two volumes; the price of each volume will be \$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.

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.

Subscription price is \$8.00 per volume of 4 issues. Single copies are \$2.50.

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 prize is \$7.00 per annual volume of six numbers.
Research Problems and Invited Addresses offered by publication should be sent to Walter Rudin, Department of Mathematics, University of Wisconsin, Madison, Wisconsin; Book Reviews to Felix Browder, Department of Mathematics, Massachusetts Institute of Technology, Cambridge 39, Massachusetts. 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, Department of Mathematics, Harvard University, Cambridge 38, Massachusetts. All other communications to the editors should be sent to the Managing Editor, E. E. Moise.

L. A. Henkin, M. R. Hestenes, Edwin Hewitt, A. S. Householder, G. B. Huff, G. A. Hunt, Nathan Jacobson, Fritz John, P. D. Lax, M. M. Loève, R. C. Lyndon, L. Markus, W. S. Massey, A. E. Meder, Jr., E. E. Moise, Deane Montgomery, R. S. Phillips, R. S. Pierce, Everett Pitcher, Alex Rosenberg, Walter Rudin, I. M. Singer, E. H. Spanier, J. D. Swift, C. B. Tompkins, S. M. Ulam, J. V. Wehausen, George Whaples, J. W. T. Youngs, Daniel Zelinsky, 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 1962. 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, 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 MICHEL LOÈVE, Statistics Department, University of California, Berkeley, California. All other communications to the editors should be addressed to the Managing Editor, W. S. MASSEY.

CONTENTS

May, 1962

Helmut Röhrl. Holomorphic fiber bundles over Riemann surfaces.	125
Book Reviews	
STEFAN BERGMAN. Integral operators in the theory of linear	
partial differential equations. Reviewed by Erwin Kreyszig	161
E. Artin. Theory of algebraic numbers. Reviewed by L. J.	
Mordell	162
G. DE B. ROBINSON. Representation theory of the symmetric	
group. Reviewed by A. H. Wallace	166
J. L. Synge. Relativity: The general theory. Reviewed by	
Alfred Schild	167
A. Y. KHINCHIN. Mathematical foundations of quantum	
statistics. Reviewed by G. W. Mackey	169
LEONARD GILLMAN and MEYER JERISON. Rings of continuous	
functions. Reviewed by Edwin Hewitt	173
E. B. DYNKIN. Theory of Markov processes and Die Grund-	
lagen der Theorie der Markoffschen Prozesse. Reviewed by	
R. M. Blumenthal	176
Research Problems	179
The Annual Meeting in Cincinnati. By J. W. T. Youngs and J. W.	404
Green	181
The February Meeting in New York. By Everett Pitcher	191
Research Announcements	
E. Eisenberg. Supports of a convex function	192
Gilbert Baumslag. A non-hopfian group	196
Gilbert Baumslag and Donald Solitar. Some two-generator	
one-relator non-Hopfian groups	199
William Browder. Fiberings of spheres and H-spaces which	
are rational homology spheres	202
Samuel Karlin and James McGregor. Determinants of	004
orthogonal polynomials	204
composable integral representations	210
E. R. Reifenberg. On the tangential properties of surfaces.	210 213
Andrew Sobczyk. Extension properties of Banach spaces	217
S. Sherman. Combinatorial aspects of the Ising model for	21/
ferromagnetism. II. An analogue to the Witt identity	225
E. M. Alfsen. The optimal Lebesgue-Radon-Nikodym in-	223
equality	230
G. J. Rieger. Solution of the Waring-Goldbach problem for	00 سے
algebraic number fields	234
Leonard Baumert, S. W. Golomb and Marshall Hall, Jr. Dis-	
covery of an Hadamard matrix of order 92	237
OPODOR DANGA COMBANY AND MENAGUA MICO	