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CONTENTS

Mathematics	1
American Mathematical Society (Indian Edition)	24
Little Mathematical Treasures	44
Mathematical Marvels	45
Mathematical World	46
Recreational Mathematics	47
References	49
Dictionaries	49
Encyclopaedia	49
Biographies	52
History of Science	54
Index	58

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MATHEMATICS

103 Trigonometry Problems

Andreescu, Titu & Feng, Zuming

This book contains carefully selected problems and solutions used in the training and testing of the USA International Mathematical Olympiad (IMO) team. Though many problems may initially appear impenetrable to the novice, most can be solved using only elementary high school mathematics techniques.

2005 ♦ 232 pp. ♦ Paperback
978-81-8128-339-9 ♦ ₹ 350.00

104 Number Theory Problems: From the Training of the USA IMO Team

Dorin, Andreescu, Andrica, Titu & Feng, Zuming

104 Number Theory Problems is a valuable resource for advanced high school students, undergraduates, instructors, and mathematics coaches preparing to participate in mathematical contests and those contemplating future research in number theory and its related areas.

Special features: Contains problems developed for various mathematical contests, including the International Mathematical Olympiad (IMO) ♦ Builds a bridge between ordinary high school examples and exercises in number theory and more sophisticated, intricate and abstract concepts and problems ♦ Begins by familiarising students with typical examples that illustrate central themes, followed by numerous carefully selected problems and extensive discussions of their solutions ♦ Combines unconventional and essay-type examples, exercises and problems, many presented in an original fashion ♦ Engages students in creative thinking and stimulates them to express their comprehension and mastery of the material beyond the classroom.

2010 ♦ 216 pp. ♦ Paperback
978-81-8489-528-5 ♦ ₹ 450.00

Across the Board: The Mathematics of Chessboard Problems

Watkins, John J.

Across the Board is the definitive work on chessboard problems. It is not simply about chess but the chessboard itself—that simple grid of squares so common to games around the world. And, more importantly, the fascinating mathematics behind it.

Using the highly visual language of graph theory, Watkins gently guides the reader to the forefront of current research in mathematics. By solving some of the many exercises sprinkled throughout, the reader can share fully in the excitement of discovery. It will captivate students and instructors, mathematicians, chess enthusiasts, and puzzle devotees.

2005 ♦ 272 pp. ♦ Paperback
978-81-7371-541-9 ♦ ₹ 350.00

Actuarial Statistics: An Introduction Using R

Deshmukh, Shailaja R.

Actuarial science is an interdisciplinary science comprising four subjects—mathematics, statistics, economics and finance. Statistics plays a key role in laying the foundation of actuarial calculations in the presence of uncertainty in the mortality pattern of society and under varying economical conditions. Actuarial calculations mainly involve determination of premium rates and computation of reserves. This book discusses the application of various basic concepts and statistical techniques in the determination of premiums and reserves for a variety of standard insurance and annuity products, under a variety of conditions. Topics dealt with include application of utility theory to establish the feasibility of the insurance business, short-term risk models,

Prices are subject to change without notice

MATHEMATICS

distribution theory related to the future life time random variable, construction of aggregate and select life tables, important concepts of financial mathematics, annuities certain, terms, endowment and whole life insurance products, monthly, quarterly, semi-annual and annual life annuities.

2010 ♦ 472 pp. ♦ Paperback
978-81-7371-690-4 ♦ ₹ 465.00

Advances in Computational Optimization and its Applications

Deb, Kalyanmoy, et al.

Optimization and analysis of systems through modelling are practices common to many engineering and scientific problem solving tasks. These techniques can be used to enhance productivity and understand and design systems better. Although they are routinely used in academia and industries abroad, such practices are yet to be popular in Indian industries and academics. This workshop proceedings presents a number of state-of-the-art papers written by experts (both from academia and industries) in the field of optimization and systems analysis from USA and India. The papers involve theoretical treatise, classical optimization methodologies, evolutionary optimization procedures and application issues. The application domains include engineering design of systems, components and processes, bioinformatics, finance, and resource allocation problems. Anyone interested in understanding, using and researching in the area of optimization will find this proceedings useful.

2007 ♦ 224 pp. ♦ Paperback
978-81-7371-585-3 ♦ Print on demand

Algebraic Geometry: A First Course

Harris, Joe

This book is intended to introduce students to algebraic geometry; to give them a sense of the

basic objects considered, the questions asked about them, and the sort of answers one can expect to obtain. It thus emphasises the classical roots of the subject. For readers interested in simply seeing what the subject is about, this avoids the more technical details better treated with the most recent methods. For readers interested in pursuing the subject further, this book will provide a basis for understanding the developments of the last half century, which have put the subject on a radically new footing. Based on lectures given at Brown and Harvard Universities, this book retains the informal style of the lectures and stresses examples throughout; the theory is developed as needed. The first part is concerned with introducing basic varieties and constructions; it describes, for example, affine and projective varieties, regular and rational maps, and particular classes of varieties such as determinantal varieties and algebraic groups. The second part discusses attributes of varieties, including dimension, smoothness, tangent spaces and cones, degree, and parameter and moduli spaces.

2010 ♦ 347 pp. ♦ Paperback
978-81-8489-522-3 ♦ ₹ 595.00

Analytical Solid Geometry

Pirzada, S. & Chishti, T.A.

This books brings to life the mathematics of perfect solid structures with a special emphasis on the difficulties felt by students in imagining three-dimensional solids. The contents covers a one-year course in analytical solid geometry for BSc (mathematics) students and will be of great use to civil engineering, architecture and computer science students in their applied mathematics course. The book is rich in exercise problems and solved examples.

2007 ♦ 336 pp. ♦ Paperback
978-81-7371-580-8 ♦ ₹ 350.00

Cake-Cutting Algorithms: Be Fair If You Can

Robertson, Jack & Webb, William

Since the famous Polish school of mathematicians (Steinhaus, Banach, and Knaster) introduced and described algorithms for the fair division problem in the 1940s, the concept has been widely popularized. This book finally gathers into one readable and inclusive source a comprehensive discussion of the state of the art in cake-cutting problems for both the novice and the professional. It offers a complete treatment of cake-cutting algorithms under all the considered definitions of fair, and presents them in a coherent, reader-friendly manner.

2003 ♦ 192 pp. ♦ Paperback
978-81-7371-448-1 ♦ ₹ 250.00

NEW

Calculus of Finance, The

Habib, Amber

This book is broadly about the mathematical aspects of finance. It introduces the reader to the basic concepts and products of modern finance and explores various mathematical models dealing with quantification of risk, which form the backbone of modern financial analysis. The emphasis is not so much on the details of the financial world as the basic principles by which one seeks an understanding of it. No prior knowledge of economics or finance is called for—an exposure to basic calculus and probability is all that is required of the reader. The appendix covers this ground in fair detail and would itself serve as a comprehensive primer of mathematics for finance for a beginner.

The book is peppered with examples that use real-life data to ground the theory covered in the book. The exercises to be worked out are

also interspersed in the text—their purpose varies from simple practice in applying formulas to extending the ideas learnt to new situations. Solutions to all the exercise problems are included as Appendix C, a feature that will be welcomed by both students and faculty.

The book will serve well as an introductory book on applied mathematics in finance, of interest to students of mathematics, finance and financial management. For those starting out as practitioners of mathematical finance, this is an ideal introduction.

Contents: Basic Concepts ♦ Deterministic Cash Flows ♦ Random Cash Flows ♦ Forwards and Futures ♦ Stock Price Models ♦ Options ♦ The Black–Scholes Model ♦ Value at Risk ♦ Appendix A ♦ Appendix B ♦ Appendix C ♦ Bibliography ♦ Index

2011 ♦ 296 pp. ♦ Paperback
978-81-7371-723-9 ♦ ₹ 370.00

Code Breaking: A History and Exploration

Kippenhahn, R.

This brilliant history and exploration of the fascinating art and science of cryptography begins with Caesar's coded letters to Cicero, and ends with the computer hackers of the present. Code breaking has always played a key role in both the romance and the reality of espionage. Now, with the advent of electronic banking and widespread concerns about personal privacy, the issues surrounding the coding and decoding of information have assumed greater importance than ever before. Rudolf Kippenhahn provides both an exciting history of cryptography and a lucid exploration of the art of coding and decoding language.

1999 ♦ 284 pp. ♦ Paperback
978-81-7371-204-3 ♦ ₹ 425.00

MATHEMATICS

Computer Algebra and Symbolic Computation: Elementary Algorithms

Cohen, Joel S.

The author explores the structure and implementation of computer algebra algorithms as well as the mathematical and computational concepts behind them. This book contains a CD with the entire text, active reference hyperlinks, and complete algorithms. It bridges the gap between software manuals, which only explain how to use computer algebra programs such as Mathematica, Maple, Derive, etc., and graduate level texts, which only describe algorithms.

2005 ♦ 342 pp. ♦ Paperback
978-81-7371-532-7 ♦ ₹ 495.00

Computer Algebra and Symbolic Computation: Mathematical Methods (with CD-ROM)

Cohen, Joel S.

Mathematica™, Maple™, and similar software packages provide programs that carry out sophisticated mathematical operations. In this book, the author explores the mathematical methods that form the basis for such programs, in particular the application of algorithms to methods such as algebraic simplification, polynomial decomposition, polynomial greatest common divisor computation, and polynomial factorisation.

This text introduces advanced methods to treat complex operations and presents implementations in such programs as Mathematica™, Maple™, and MuPAD™. The accompanying CD includes the complete text, hyperlinks, and algorithms as well as additional reference files.

2005 ♦ 344 pp. ♦ Paperback
978-81-7371-531-0 ♦ ₹ 495.00

Computer Arithmetic Algorithms (Second Edition)

Koren, Israel

This book explains the principles of algorithms used in arithmetic operations on digital computers. It covers basic arithmetic operations like addition, subtraction, multiplication, and division in fixed-point and floating-point number systems in addition to more complex operations such as square root extraction and evaluation of exponential, logarithmic, and trigonometric functions.

This new edition incorporates sections on floating-point adders, floating-point exceptions, general carry-look-ahead adders, prefix adders, ring adders, and fused multiply-add units. New algorithms and implementations have been added to almost all chapter. An on-line JavaScript-based simulator for many of the algorithms contained in the book is available at www.ecs.umass.edu/ece/koren/arith/simulator.

2005 ♦ 300 pp. ♦ Paperback
978-81-7371-533-4 ♦ ₹ 350.00

Convex Optimization Theory

Bertsekas, Dimitri P.

The book *Convex Optimization Theory* provides an insightful, concise and rigorous treatment of the basic theory of convex sets and functions in finite dimensions and the analytical/geometrical foundations of convex optimization and duality theory. The convexity theory is developed first in a simple accessible manner using easily visualized proofs. The focus then shifts to a transparent geometrical line of analysis to develop the fundamental duality between descriptions of convex sets and functions in terms of points and in terms of hyperplanes. Finally, convexity theory and abstract duality are applied to problems of constrained optimization, Fenchel and conic

duality and game theory to develop the sharpest possible duality results within a highly visual geometric framework.

The Indian edition of the book alone carries a supplementary chapter containing the most popular convex optimization algorithms and some of the new optimization algorithms otherwise available at <http://www.athenasc.com/convexduality.html>.

Key features: ♦ Rigorous and comprehensive development of the theory of convex sets and functions in the classical tradition of Fenchel and Rockafellar ♦ A geometric and highly visual treatment of convex optimization problems including duality, existence of solutions, and optimality conditions

2010 ♦ 420 pp. ♦ Paperback
978-81-7371-714-7 ♦ ₹ 595.00

Differential Equations with Applications and Programs

Balachandra Rao, S. & Anuradha, H.R.

This book is designed to serve as a textbook for undergraduate students of mathematics, physics, physical chemistry, engineering, etc. It contains a large number of worked examples besides exercises and answers. A whole chapter is devoted to numerical techniques to solve differential equations in which computer programs and printouts of worked examples are included.

1996 ♦ 416 pp. ♦ Paperback
978-81-7371-023-0 ♦ ₹ 395.00

Discrete Mathematical Structures with Applications to Combinatorics

Ramaswamy, V.

Meant to serve as an introduction to discrete mathematical structures, this book covers

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the topics taught in a one-semester course at the undergraduate level in computer science, information science and other engineering branches. The chapters on combinatorics will bring home the practical utility of the various concepts introduced in the book and enable appreciation of the myriad applications that apparently simple concepts such as relations, functions and the pigeon-hole principle have.

2006 ♦ 264 pp. ♦ Paperback
978-81-7371-500-6 ♦ ₹ 250.00

é: The Story of a Number

Maor, E.

The interest earned on a bank account, the arrangement of seeds in a sunflower, and the shape of the Gateway Arch in St. Louis are all intimately connected with the mysterious number é. In this informal and engaging history, Eli Maor portrays the curious characters and the elegant mathematics that lie behind the number.

1999 ♦ 240 pp. ♦ Paperback
978-81-7371-212-8 ♦ ₹ 275.00

Educative JEE: Mathematics

(Second Edition)

Joshi, K.D.

Educative JEE is an attempt to lay before the students both the concepts as well as the process of solving problems at the JEE (the Joint Entrance Examination conducted to gain entry into the IITs). The problems have been collected mostly from JEE papers ranging over a period of two decades. The thrust is not so much on solving the problems as in the assimilation of the theory behind it and learning a few related new concepts. The solutions then come as natural corollaries. It also contains some helpful tips aimed at sharpening the thinking ability and increasing the mathematical maturity of the student.

MATHEMATICS

In the second edition, ♦ a few more problems or, occasionally, a new solution to an existing problem have been added ♦ a few figures have been redrawn and some new figures have been added to help understand the text ♦ two appendices, one on matrices and one on solid coordinate geometry have been included. They have been explained in detail, in keeping with the new JEE syllabus.

2010 ♦ 1124 pp. ♦ Paperback
978-81-7371-712-3 ♦ ₹ 625.00

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Elementary Number Theory : A Collection of Problems with Solutions

Krishnan

This book gives a brief introduction to the elementary number theory and provides a collection of three hundred problems together with their solutions. It is basically a problem book aimed at school students preparing for talent tests like mathematical Olympiads. Most of the problems are chosen from question papers of the regional, national and international mathematical Olympiads, and the talent tests are conducted by the Association of Mathematics Teachers of India. Some are taken from standard text books, and some are new.

Engineering Mathematics

Sarveswara Rao, Koneru

This book incorporates in one volume the material covered in the mathematics course of undergraduate programmes in engineering and technology. The topics discussed include sequences and series, mean value theorems, evolutes, functions of several variables, solutions of ordinary and partial differential equations,

Laplace, Fourier and Z-transform with their applications. The book also contains chapters on vector calculus, matrices, Fourier series and numerical algorithms. The text is substantiated with about 450 worked-out examples and nearly an equal number of exercises.

2002 ♦ 520 pp. ♦ Paperback
978-81-7371-424-5 ♦ ₹ 450.00

══════ FORTHCOMING ══════

Engineering Optimization: A Modern Approach

Ranjan Ganguli

The deployment of optimization techniques at the conceptual design stage of complex technical systems is today no longer a desirable trait but an absolute necessity.

This book aims to make the optimization technique pervasive in engineering design by moving the problem from an academic setting to an industrial platform. It provides a thorough understanding of the concepts of optimization necessary for a robust design of technical systems. The approach is from a modern perspective-it dwells on surrogate modelling and non-gradient-based algorithms and at the same time emphasizes classical methods for pedagogical reasons. Nonlinear optimization, response-surface method and genetic-algorithm approaches have been focussed upon to bridge the gap between nonlinear programming and engineering optimization techniques.

The best way to learn optimization methods is undoubtedly by solving problems and following it up with exercises in computer programming. To enable this experience, the book has several solved examples, some of them non-trivial, besides many unsolved problems for the student to work out.

**Excursions into Mathematics:
The Millennium Edition**

Beck, Anatole, Bleicher, Michael N. & Crowe, Donald W.

Since it was first published three decades ago, this book has been one of the most popular mathematical books written for a general audience. Taking the reader for short 'excursions' into several specific disciplines of mathematics, it makes mathematical concepts accessible to a wide audience.

The all-new Millennium Edition is updated with current research and new solutions to outstanding problems that have been discovered since the last edition was printed, such as the solution to the well-known 'four-color problem'.

This is an exciting revision of the original, much-loved classic. Everyone with an interest in mathematics should read this book.

2003 ♦ 528 pp. ♦ Paperback
978-81-7371-441-2 ♦ ₹ 495.00

Explorations in Mathematics

Hattangadi, A.A.

The book deals with mathematical concepts from high school onwards. It discusses Pythagoras' Theorem, logarithms, prime numbers, Pi, Fibonacci sequence and its variations, how to multiply extremely large integers, the Gregorian calendar, how a PC can be programmed using BASIC, number systems such as decimal, binary, octal and hexadecimal systems, and finally how string variables in the BASIC language can convert figures (in a cheque for example) into words.

2001 ♦ 240 pp. ♦ Paperback
978-81-7371-387-3 ♦ ₹ 295.00

Field and Galois Theory

Morandi, Patrick

The purpose of this book is twofold. First, it is written to be a textbook for a graduate level course on Galois theory or field theory. Second, it is designed to be a reference for researchers who need to know field theory. The book is written at the level of students who have familiarity with the basic concepts of group, ring, vector space theory, including the Sylow theorems, factorization in polynomial rings, and theorems about bases of vector spaces. This book has a large number of examples and exercises, a large number of topics covered, and complete proofs given for the stated results. To help readers grasp field.

2010 ♦ 304 pp. ♦ Paperback
978-81-8489-621-3 ♦ ₹ 475.00

First Course in Real Analysis, A

Suryanarayan, E.R.

In early calculus courses, the chief emphasis is on developing computational techniques and applications. In real analysis, the emphasis is primarily on understanding the concepts and developing the ability to prove results. A student should not only learn manipulative skills but also argumentative skills.

It is assumed that the reader has completed courses in elementary calculus covering one-, two- and three-dimensional calculus where he/she is exposed to only the mechanics of calculus without much theory.

A course based on this text is suitable not only for mathematics majors, but also for science and engineering majors who need a careful introduction to the concepts and methods of analytical proofs.

2003 ♦ 216 pp. ♦ Paperback
978-81-7371-430-6 ♦ Print on demand

MATHEMATICS

First Course on Representation Theory and Linear Lie Groups

Bagchi S C et al.

This book is intended to serve as a text book for a one-semester course for MSc/MPhil students of mathematics at Indian Universities, and has, in fact, been class tested by two of the authors at the Master's level.

Most students are not introduced to Lie Theory and non-commutative harmonic analysis until they are in the second year of the PhD programme. In these notes, by sticking to closed subgroups of the general linear group, the authors give a flavour of Lie Theory, while keeping the prerequisites to a minimum. The only prerequisites are Real Analysis (including some Fourier Series) and Elementary Functional analysis.

Students of theoretical physics will also find this exposition useful.

2000 ♦ 96 pp. ♦ Paperback
978-81-7371-284-5 ♦ Print on demand

Fun and Fundamentals of Mathematics

Narlikar, M. & Narlikar, J.

This book introduces fundamental ideas in mathematics through interesting puzzles. Students, from age 12 upwards, who are bored with routine classwork in maths will enjoy these puzzles which will sharpen their logical reasoning. It is designed to arouse an interest in mathematics among readers in the 12–18 age group.

2001 ♦ 200 pp. ♦ Paperback
978-81-7371-398-9 ♦ ₹ 250.00

Gamma: Exploring Euler's Constant

Havil, Julian

Among the myriad of constants that appear in mathematics, p , e , and i are the most familiar. Following closely behind is g , or gamma, a constant that arises in many mathematical areas yet maintains a profound sense of mystery.

In a tantalising blend of history and mathematics, Julian Havil takes the reader on a journey through logarithms and the harmonic series, the two defining elements of gamma, toward the first account of gamma's place in mathematics.

Sure to be popular with not only students and instructors but all math aficionados, Gamma takes us through countries, centuries, lives, and works, unfolding along the way the stories of some remarkable mathematics from some remarkable mathematicians

2005 ♦ 292 pp. ♦ Paperback
978-81-7371-509-9 ♦ ₹ 350.00

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Graph Theory

S Pirzada and A Dharwadker

In this comprehensive and up-to-date book on graph theory, the reader is provided a thorough understanding of the fundamental topics in the subject: the structure of graphs, the techniques used to analyse problems in graph theory and the use of graph theoretical algorithms in mathematics, engineering and computer science. Many topics that are generally not found in standard books are described, such as new proofs of various classical theorems, signed degree sequences, criteria for graphical sequences, eccentric sequences, and matching and decomposition of planar graphs into trees, with scores in digraphs being introduced for the first time.

Group Theory: Selected Problems

Sury, B.

The selection of problems in *Group Theory* is principally aimed at undergraduate (honours) and postgraduate students of mathematics. Excepting a few, these problems are meant only to supplement the existing ones in standard texts.

The comments interspersed in the text help to put the problems in perspective with other problems and with the subject itself. The intention of the book is two-fold: to introduce via problems some concepts not usually taught at the master's level, and reinforce existing knowledge by means of new problems.

2004 ♦ 168 pp. ♦ Paperback
978-81-7371-491-7 ♦ ₹ 195.00

How to Enjoy Calculus

Pine, E.S.

This book is an essential primer for anyone who wants to familiarise himself or herself with Calculus. Unlike other books on this subject, it is easy for anyone from any discipline to understand it. For too long this subject has been rendered mysterious and obscure. With this book, Calculus is demystified and can be easily grasped. This book also acts as a stepping-stone and enables you to go on to read other books on Calculus with ease.

2002 ♦ 136 pp. ♦ Paperback
978-81-7371-406-1 ♦ ₹ 175.00

Imaginary Tale, An: The Story of $\sqrt{-1}$

Nahin, Paul J.

The author tells the 2000-year-old history of one of mathematics' most elusive numbers, the square root of minus one, also known as *i*, re-

creating the baffling mathematical problems that conjured it up and the colourful characters who tried to solve them. Addressing readers with both a general and scholarly interest in mathematics, Nahin weaves into this narrative entertaining historical facts, mathematical discussions, and the application of complex numbers and functions to important problems.

2001 ♦ 280 pp. ♦ Paperback
978-81-7371-399-6 ♦ ₹ 325.00

IMO Compendium, The: A Collection of Problems Suggested for The International Mathematical Olympiads: 1959–2004

Djukic, D. et al.

The IMO has sparked off a burst of creativity among enthusiasts in creating new and interesting mathematics problems. In an extremely stiff competition, only six problems are chosen each year to appear on the IMO. The total number of problems proposed for the IMOs up to this point is staggering and, as a whole, this collection of problems represents a valuable resource for all high school students preparing for the IMO.

The IMO Compendium is the ultimate collection of challenging high-school-level mathematics problems. It will be an invaluable resource, not only for high-school students preparing for mathematics competitions, but for anyone who loves and appreciates math.

2010 ♦ 760 pp. ♦ Paperback
978-81-8489-525-4 ♦ ₹ 995.00

Introduction to Analysis, An

Brown, Arlen & Percy, Carl

This book is intended to serve as a textbook for an introductory course in mathematical analysis. In preliminary form it has been used in this way

MATHEMATICS

at the University of Michigan, Indiana University, and Texas A&M University. The book addresses the needs of a beginning graduate student, that is a student who has completed an undergraduate program with a mathematics major.

2010 ♦ 304 pp. ♦ Paperback
978-81-8489-620-6 ♦ ₹ 495.00

Introduction to Analytic Number Theory

Apostol, Tom M.

This introductory textbook is designed to teach undergraduates the basic ideas and techniques of number theory, with special consideration to the principles of analytic number theory. The first five chapters treat elementary concepts such as divisibility, congruence and arithmetical functions. The topics in the next chapters include Dirichlet's theorem on primes in progressions, Gauss sums, quadratic residues, Dirichlet series, and Euler products with applications to the Riemann zeta function and Dirichlet L-functions. Also included is an introduction to partitions. Among the strong points of the book are its clarity of exposition and a collection of exercises at the end of each chapter. The first ten chapters, with the exception of one section, are accessible to anyone with a knowledge of elementary calculus; the last four chapters require some knowledge of complex function theory including complex integration and residue calculus.

2010 ♦ 352 pp. ♦ Paperback
978-81-8489-521-6 ♦ ₹ 595.00

Introduction to Lie Algebras and Representation Theory

Humphreys, J.E.

This book is designed to introduce the reader to the theory of semisimple Lie algebras over algebraically closed field of characteristic 0, with emphasis on representations. A good knowledge of linear algebra

(including eigenvalues, bilinear forms, Euclidean spaces, and tensor products of vector spaces) is presupposed, as well as some acquaintance with the methods of abstract algebra. The first four chapters might well be read by a bright undergraduate; however, the remaining three chapters are more demanding.

2010 ♦ 192 pp. ♦ Paperback
978-81-8489-616-9 ♦ ₹ 395.00

Introduction to Mathematical Computer Science, An

Viswanath, Kasturi

An Introduction to Mathematical Computer Science explores an alternative approach to the teaching of computer science, an approach that is independent of technology, using a methodology that simultaneously deals with both theory and practice.

The 'mapcode' formalism introduced here is based on classical ideas, but this book is the first to explore the possibilities of the formalism extensively to evolve the subject as an area of mathematics. Using only the algebra of sets and maps and no advanced mathematics or formal logic, the book suggests a unified point of view for understanding the structure of finite automata, Turing machines, von Neumann machines, and neural systems. It also introduces a 10-step design process for devising algorithms and verifying their termination and correctness. Recursion and sorting algorithms are examined. Data types and Boolean function theory are explained from a novel point of view.

The book, with its several illustrative diagrams and exercises, will serve as a textbook for mathematics and computer science students at both undergraduate and graduate levels.

2008 ♦ 304 pp. ♦ Paperback
978-81-7371-630-0 ♦ ₹ 450.00

==== FORTHCOMING ====

Introductory Course in Elementary Number Theory, An

Wissam Raji

This book will serve as a textbook for an undergraduate course in number theory. Proofs of basic theorems are presented in an interesting way that can be read and understood even by non-majors. The exception are the last two chapters where a background in calculus and algebra is required. The exercises are carefully chosen to broaden the understanding of the concepts. Analytic number theory has also been discussed.

Linear Algebra

Greub, Werner H.

This textbook gives a detailed and comprehensive presentation of the linear algebra based on axiomatic treatment of linear spaces. The author maintains a good balance between modern algebraic interests and traditional linear algebra. Several chapters have been substantially rewritten for clarity of exposition, although their basic content is unchanged. A considerable number of exercises covering new material has also been added.

2010 ♦ 492 pp. ♦ Paperback
978-81-8489-633-6 ♦ ₹ 700.00

Linear Algebra Done Right (Second Edition)

Axler, Sheldon

This text for a second course in linear algebra is aimed at math majors and graduate students. The novel approach taken here banishes determinants to the end of the book and focusses on the central goal of linear algebra: understanding the structure of linear operators on vector spaces. The author

has taken unusual care to motivate concepts and to simplify proofs. A variety of interesting exercises in each chapter helps students understand and manipulate the objects of linear algebra. No prerequisites are assumed other than the usual demand for suitable mathematical maturity. This second edition includes a new section on orthogonal projections and minimization problems. The sections on self-adjoint operators, normal operators, and the spectral theorem have been rewritten. New examples and new exercises have been added, several proofs have been simplified, and hundreds of minor improvements have been made throughout the text.

2010 ♦ 266 pp. ♦ Paperback
978-81-8489-532-2 ♦ ₹ 530.00

Linear Optimization and Extensions: Problems and Solutions

Alevras, Dimitris & Padberg, Manfred W.

This book offers a comprehensive treatment of the exercises and case studies as well as summaries of the chapters of the book *Linear Optimization and Extensions* by Manfred Padberg. It covers the areas of linear programming and the optimisation of linear functions over polyhedra in finite dimensional Euclidean vector spaces.

The main topics treated in the book are: Simplex algorithms and their derivatives including the duality theory of linear programming; Polyhedral theory, pointwise and linear descriptions of polyhedra, double description algorithms, Gaussian elimination with and without division, the complexity of simplex steps; Projective algorithms, the geometry of projective algorithms, Newtonian barrier methods; Ellipsoids algorithms in perfect and in finite precision arithmetic, the equivalence of linear optimisation and polyhedral separation; The foundations of mixed-integer programming and combinatorial optimisation.

2010 ♦ 558 pp. ♦ Paperback
978-81-8489-524-7 ♦ ₹ 725.00

MATHEMATICS

Math Charmers: Tantalizing Tidbits for the Mind

Weaver, Jefferson Hane

This book aims to inspire people by the beauty of mathematics and not necessarily its usefulness, as is most often the case when trying to motivate youngsters to the subject. It provides sufficient evidence of the beauty of mathematics through many examples in a variety of its branches. To make these examples attractive and effective, they were selected on the basis of the ease with which they can be understood at first reading.

2006 ♦ 302 pp. ♦ Paperback
978-81-7371-562-4 ♦ ₹ 375.00

Math Explorer, The: A Journey through the Beauty of Mathematics

Weaver, Jefferson Hane

This stress-free layperson's introduction to the intriguing world of numbers is designed to acquaint the general reader with the elegance and wonder of mathematics. Even the most math-phobic among us will be lulled into appreciation by Weaver's creative and disarming discussions of this supposedly formidable intellectual discipline.

He covers all the basics: irrational and imaginary numbers, algebra, geometry, trigonometry, differential and integral calculus, the concepts of zero and infinity, vectors, set theory, chance and probability, and much more. This enjoyable volume gives readers a working knowledge of math's most important concepts, an appreciation of its elegant logical structure, and an understanding of its historical significance in creating our contemporary world.

2006 ♦ 288 pp. ♦ Paperback
978-81-7371-563-1 ♦ ₹ 350.00

Math Problems Notebook, The

Boju, Valentin & Funar, Louis

The Math Problems Notebook is a collection of nontrivial, unconventional problems requiring deep insight and imagination reminiscent of those discussed at Sunday Math Circles. These circles have become a place for disseminating beautiful mathematics at an elementary level for college students who have a common passion for mathematics.

The problems cover many topics, including number theory, algebra, combinatorics, geometry and analysis, of varying levels of difficulty. The presentation of each topic begins with simple exercises and follows with more difficult problems, challenging enough even for the experienced problem solver. The easier problems focus on basic methods and tools, while the more advanced problems develop problem-solving techniques, intuition and promote further research.

2010 ♦ 248 pp. ♦ Paperback
978-81-8489-527-8 ♦ ₹ 450.00

Mathematical Analysis

Sitaram, A. & Pati, V.

This collection of mathematical articles focusses on some elementary aspects of mathematical analysis, especially infinite sequences and infinite series. Some foundational issues have been addressed in the course of providing rigorous proofs of mathematical results. Biographical sketches of the mathematicians who have contributed to analysis enrich the content of this book.

It can be used by students of mathematics to supplement what they learn in their regular courses.

2001 ♦ 160 pp. ♦ Paperback
978-81-7371-291-3 ♦ ₹ 250.00

Mathematical Analysis: An Introduction

Browder, Andrew

This is a textbook containing more than enough material for a year-long course in analysis at the advanced undergraduate or beginning graduate level. The book begins with a brief discussion of sets and mappings, describes the real number field, and proceeds to a treatment of real-valued functions of a real variable. Separate chapters are devoted to the ideas of convergent sequences and series, continuous functions, differentiation, and the Riemann integral.

2010 ♦ 447 pp. ♦ Paperback
978-81-8489-520-9 ♦ ₹ 595.00

Mathematical Century, The: The 30 Greatest Problems of the Last 100 Years

Odifreddi, Piergiorgio

The author concentrates on thirty highlights of pure and applied mathematics. He opens by discussing the four main philosophical foundations of mathematics of the nineteenth century and ends by describing the four most important open mathematical problems of the twenty first century.

He devotes equal attention to pure and applied mathematics, with applications ranging from physics and computer science to biology and economics.

Special attention is dedicated to the famous '23 problems' outlined by David Hilbert in his address to the International Congress of Mathematicians in 1900 as a research programme for the new century, and to the work of the winners of the Fields Medal, the equivalent of a Nobel Prize in mathematics.

2005 ♦ 224 pp. ♦ Paperback
978-81-7371-542-6 ♦ ₹ 275.00

Mathematical Masterpieces: Further Chronicles by the Explorers

Knoebel, A. et al.

Experience the discovery of mathematics by reading the original work of some of the greatest minds throughout history. Here are the stories of four mathematical adventures, including the Bernoulli numbers as the passage between discrete and continuous phenomena, the search for numerical solutions to equations throughout time, the discovery of curvature and geometric space, and the quest for patterns in prime numbers. Each story is told through the words of the pioneers of mathematical thought. Particular advantages of the historical approach include providing context to mathematical inquiry, perspective to proposed conceptual solutions, and a glimpse into the direction research has taken. The text is ideal for an undergraduate seminar, independent reading, or a capstone course, and offers a wealth of student exercises with a prerequisite of at most multivariable calculus.

2010 ♦ 348 pp. ♦ Paperback
978-81-8489-542-1 ♦ ₹ 595.00

Mathematical Methods in Classical and Quantum Physics

Dass, Tushi & Sharma, S. K.

The book is intended to provide an adequate background for various theoretical physics courses, especially those in classical mechanics, electrodynamics, quantum mechanics and statistical physics. Each topic is dealt with in a generally self-contained manner and the text is interspersed with a number of solved examples and a large number of exercise problems.

1998 ♦ 716 pp. ♦ Paperback
978-81-7371-089-6 ♦ ₹ 725.00

MATHEMATICS

Mathematical Olympiad Challenges

Andreescu, Titu & Gelca, Razvan

This is a rich collection of problems put together by two experienced and well-known professors of the US International Mathematical Olympiad Team. Hundreds of beautiful, challenging and instructive problems from algebra, geometry, trigonometry, combinatorics and number theory are clustered by topic into self-contained sections with solutions provided separately. All sections start with an essay discussing basic facts and one or two representative examples. A list of carefully chosen problems follows. Additionally, historical insights and asides are presented to stimulate further inquiry. The emphasis throughout is on encouraging readers to move away from routine exercises and memorised algorithms toward creative solutions to open-ended problems.

2005 ♦ 280 pp. ♦ Paperback
978-81-8128-323-8 ♦ ₹ 375.00

Mathematical Olympiad Treasures

Andreescu, Titu & Enescu, Bogdan

This book aims at building a bridge between ordinary high-school exercises and more sophisticated, intricate and abstract concepts and problems in undergraduate mathematics. The book contains a stimulating collection of problems in the subjects of geometry and trigonometry, algebra, number theory and combinatorics.

While it may be considered a sequel to *Mathematical Olympiad Challenges*, the focus of *Treasures* is on engaging a wider audience of undergraduates to think creatively in applying techniques and strategies to problems in the real world.

Throughout the book, students are encouraged to express their ideas, conjectures, and conclusions in writing.

The goal is to help readers develop a host of new mathematical tools and strategies that will be useful beyond the classroom and in a number of disciplines.

2005 ♦ 248 pp. ♦ Paperback
978-81-8128-322-1 ♦ ₹ 375.00

Mathematical Physics: The Basics

Joglekar, S. D.

This book covers the basic mathematical techniques that are essential at the master's level in physics and chemistry, and provides the basic underlying preparation needed for any research student in either branch. It deals with vectors, tensors, Cartesian coordinates, Lorentz tensors, curvilinear coordinates, linear vector spaces, linear operators, matrices, complex variables and their applications at an advanced level. In the companion volume titled, *Advanced Topics*, more advanced topics are dealt with to cover the entire spectrum of requirement for a course on mathematical physics at the post graduate or research level.

Distributed worldwide (except India) by CRC Press LLC, USA, Taylor and Francis Group

2005 ♦ 256 pp. ♦ Paperback
978-81-7371-422-1 ♦ ₹ 295.00

Mathematical Physics: Advanced Topics

Joglekar, S. D.

This is the companion volume to *Mathematical Physics: The Basics*, which covers topics like vectors, tensors, Cartesian coordinates, Lorentz tensors, curvilinear coordinates, linear vector spaces, linear operators, matrices, complex variables and their applications. It covers more advanced topics taught in the second/third semester which include ODE, Gamma and beta functions, Bessel functions, spherical harmonics

and special functions, partial differential equations, generalised functions, and group theory. Together, the two volumes cover the subject of mathematical physics for a PG course in physical sciences.

Distributed worldwide (except India) by CRC Press LLC, USA, Taylor and Francis Group

2006 ♦ 264 pp. ♦ Paperback
978-81-7371-560-0 ♦ ₹ 295.00

Mathematical Vistas: From a Room with Many Windows

Hilton, Peter, Holton, Derek & Pedersen, Jean

The goal of *Mathematical Vistas* is to stimulate the interest of bright people in mathematics. The book consists of nine related mathematical essays which will intrigue and inform the curious reader. In order to offer a broad spectrum of exciting developments in mathematics, topics are treated at different levels of depth and thoroughness. Some chapters can be understood completely with little background, others can be thought of as appetisers for further study. A number of breaks are included in each chapter. These are problems designed to test the reader's understanding of the material thus far in the chapter.

2010 ♦ 349 pp. ♦ Paperback
978-81-8489-523-0 ♦ ₹ 595.00

FOORTHCOMING

Mathematics for Empowerment: Arithmetic and Algebra, Part 1

Shailesh Shirali

The book is part of a two-volume set in Arithmetic and Algebra that explores topics of interest to students of mathematics in classes 7, 8 and 9 in Indian schools. Students reading this book will be encouraged to seek a career in pure or applied

mathematics. It will also help higher secondary students to recapitulate the fundamental principles of arithmetic and algebra. The book will be appreciated by the appreciable number of mathematically talented students in Indian schools.

Mathematics in Nature

Adam, John A.

Generously illustrated, written in an informal style, and replete with examples from everyday life, this book is an excellent and undaunting introduction to the ideas and methods of mathematical modelling. It illustrates how mathematics can be used to formulate and solve puzzles observed in nature and to interpret the solutions. Readers will develop an understanding of the symbiosis that exists between basic scientific principles and their mathematical expressions as well as a deeper appreciation for such natural phenomena as cloud formations, halos and glories, tree heights and leaf patterns, butterfly and moth wings, and even puddles and mud cracks.

Developed out of a university course, this book makes an ideal supplemental text for courses in applied mathematics and mathematical modelling. It will also appeal to mathematics educators and enthusiasts at all levels, and is designed so that it can be dipped into at leisure.

2004 ♦ 400 pp. ♦ Paperback
978-81-7371-508-2 ♦ ₹ 450.00

Measure and Probability

Athreya, S.R. & Sunder, V.S.

This book has been designed primarily for students at the masters and doctoral levels. It covers the fundamentals of measure theory and probability theory. Among the highlights are alternative proofs of Riesz representation theorem and the law of large numbers. The appendix treats many basic topics such as

MATHEMATICS

metric spaces, topological spaces and the Stone–Weierstrass theorem.

Distributed worldwide (except India) by CRC Press LLC, USA, Taylor and Francis Group

2008 ♦ 232 pp. ♦ Paperback
978-81-7371-613-3 ♦ ₹ 375.00

Measure Theory

Doob, J.L

This book is different from other books on measure theory in that it accepts probability theory as an essential part of measure theory. This means that many examples are taken from probability; that probabilistic concepts such as independence, Markov processes, and conditional expectations are integrated into the text rather than being relegated to an appendix; that more attention is paid to the role of algebras than is customary; and that the metric defining the distance between sets as the measure of their symmetric difference is exploited more than is customary.

2010 ♦ 232 pp. ♦ Paperback
978-81-8489-615-2 ♦ ₹ 395.00

Modern Geometry – Methods and Applications: Part I: The Geometry of Surfaces, Transformation Groups, and Fields (Second Edition)

Dubrovin B.A., Fomenko A.T., Novikov S.P.

This is the first volume of a three-volume introduction to modern geometry, with emphasis on applications to other areas of mathematics and theoretical physics. Topics covered include tensors and their differential calculus, the calculus of variations in one and several dimensions, and geometric field theory. This material is explained in as simple and concrete a language as possible, in a terminology acceptable to physicists. The text for the second edition has been substantially revised.

1984 ♦ 468 pp. ♦ Paperback
978-81-8489-655-8 ♦ ₹ 650.00

Modern Geometry – Methods and Applications: Part II. The Geometry and Topology of Manifolds

Dubrovin B.A., Fomenko A.T., Novikov S.P.

This is the second volume of a three-volume introduction to modern geometry, with emphasis on applications to other areas of mathematics and theoretical physics. Topics covered include homotopy groups, fibre bundles, dynamical systems, and foliations. The exposition is simple and concrete, and in a terminology palatable to physicists.

1985 ♦ 430 pp. ♦ Paperback
978-81-8489-659-6 ♦ ₹ 725.00

Modern Geometry – Methods and Applications: Part III. Introduction to Homology Theory

Dubrovin B. A., Fomenko A.T., Novikov S. P.

Over the past 15 years, the geometrical and topological methods of the theory of manifolds have assumed a central role in the most advanced areas of pure and applied mathematics as well as theoretical physics. The three volumes of *Modern Geometry-Methods and Applications* contain a concrete expositions of these methods together with their main application in mathematics and physics. The third volume, presented in highly accessible language, concentrates on homology theory. It contains introduction to the contemporary methods for the calculation of homotopy groups and the classification of manifolds. Both scientists and students of mathematics as well as theoretical physics will find this book to be a valuable reference and text.

1990 ♦ 416 pp. ♦ Paperback
978-81-8489-660-2 ♦ ₹ 650.00

www.universitiespress.com

Number Theory

Shirali, Shailesh A. & Yogananda, C.S.

Number theory has fascinated mathematicians from the most ancient of times. A remarkable feature of number theory is the fact that there is something in it for everyone from puzzle enthusiasts, problem solvers and amateur mathematicians to professional scientists and technologists. The articles included form a varied lot, beginning with a puzzle, 'find four positive integers such that the sum of any two is a square', to an expository article on one of the great mathematical achievements of the 20th century, the proof of 'Fermat's Last Theorem'.

2003 ♦ 112 pp. ♦ Paperback
978-81-7371-454-2 ♦ ₹ 175.00

Numerical Methods

Boehm, W. & Prautzsch, H.

The development and analysis of constructive algorithms in numerical mathematics has become a focus of applied mathematics since the practical realisation of these algorithms by electronic computers is no longer restricted to trivial examples.

This book describes algorithmic solutions whose basic ideas are common to a variety of mathematical problems. By means of the methods presented, the reader will acquire the skills—besides a fundamental knowledge—to successfully work on related subjects in this field.

2005 ♦ 196 pp. ♦ Paperback
978-81-7371-534-1 ♦ ₹ 275.00

Numerical Methods with Programs in BASIC, FORTRAN, Pascal and C++ (Revised Edition)

Balachandra Rao, S. & Shantha, C.K.

The book discusses the important numerical methods which are frequently used in mathematical, physical, engineering and biological sciences. It will serve as an ideal textbook for the undergraduate and diploma courses. The revised edition has a section on C++ and programs in C++.

2004 ♦ 504 pp. ♦ Paperback
978-81-7371-472-6 ♦ ₹ 425.00

Partial Differential Equations

Rauch, Jeffrey

The objective of this book is to present an introduction to the ideas, phenomena, and methods of partial differential equations. This material can be presented in one semester and requires no previous knowledge of differential equations, but assumes the reader to be familiar with advanced calculus, real analysis, the rudiments of complex analysis, and the language of functional analysis. Topics discussed in the text include elliptic, hyperbolic, and parabolic equations, the energy method, maximum principle, and the Fourier Transform. The text features many historical and scientific motivations and applications. Included throughout are exercises, hints, and discussions which form an important and integral part of the course.

2010 ♦ 280 pp. ♦ Paperback
978-81-8489-623-7 ♦ ₹ 475.00

MATHEMATICS

Pi: A Biography of the World's Most Mysterious Number

Posamentier, Alfred S. & Lehmann, Ingmar

Pi—this seemingly mundane number—holds a world of mystery, which has fascinated mathematicians from ancient times to the present. What is Pi? What is the real value of Pi? How do mathematicians determine the value of Pi? In what ways is Pi used? How was it calculated in ancient times? Its elusive nature has led investigators over the years to ever-closer approximations.

In this delightful introduction to one of math's most interesting phenomena, Drs Posamentier and Lehmann review Pi's history from pre-biblical times to the twenty-first century and the many amusing and often mind-boggling attempts to estimate its precise value. This enlightening, intriguing, and stimulating approach to mathematics will entertain and fascinate readers while honing their mathematical literacy.

2006 ♦ 324 pp. ♦ Paperback
978-81-7371-561-7 ♦ ₹ 395.00

Popular Lectures in Undergraduate Mathematics

Deo, Sadashiv G. et al.

"What is mathematics?," "What does it have to do with real life?"—These are questions which are rarely answered while teaching mathematics. But once students realise the meaning of mathematics, its strengths and limitations, its history and future, its relations with real-life situations, its beauty and intellectual challenges, the learning process becomes a fountain of delight and pleasure. The aim of this book is to provide just such an approach to teaching and learning. The present volume is the outcome of a series of lectures delivered at many universities, colleges, seminars and conferences to reduce the gap between class-room teaching and

learning. The lectures will help mathematics teachers make their classroom discussions more innovative, promising and fruitful. The book also provides scope for students and teachers to formulate interesting mathematical projects for their curriculum requirements.

2009 ♦ 284 pp. ♦ Paperback
978-81-7371-662-1 ♦ ₹ 395.00

Probability and Statistics

Delampady, M., Krishnan, T. & Ramasubramanian, S. (Eds.)

This book covers probability, statistical decision theory, stochastic processes, sampling, model building, etc. It can be used by students of mathematics and statistics to complement what they learn in their regular courses. It will also be of interest to students of other sciences like biology and physics for understanding the role that probability and statistics play in their respective fields.

2000 ♦ 200 pp. ♦ Paperback
978-81-7371-289-0 ♦ ₹ 250.00

NEW

Probability and Statistics for Engineers and Scientists

Rao, Shankar, G

A firm understanding of the concepts of probability and statistics is essential for the quantitative analysis of risk, uncertainty and reliability in engineering problems. This introductory textbook, rich in solved problems, provides a comprehensive coverage of the topics of probability and statistics for an undergraduate course in science and engineering. The theoretical concepts are dealt with in a straightforward manner, with emphasis on their applications to

real-world problems. Exercises of varied levels of difficulty have been included so as to give the student an exposure to wide variety of practical situations where the applications of the concepts learnt play a role in decision making.

Contents: Preface ❖ Probability ❖ Random Variables ❖ Probability Distributions ❖ Sampling Distributions ❖ Theory of Estimation ❖ Hypothesis Testing ❖ Distribution ❖ Test of Significance: Small Samples ❖ Curve Fitting ❖ Correlation and Regression ❖ Queueing Theory ❖ Stochastic Process ❖ Appendix ❖ Bibliography ❖ Index

2011 ♦ 524 pp. ♦ Paperback
978-81-7371-744-4 ♦ ₹ 350.00

Problems in Real and Complex Analysis

Gelbaum, Bernard R.

This book builds upon the earlier volume *Problems in Analysis*, more than doubling it with a new section of problems on complex analysis. The problems on real analysis from the earlier book have all been checked, and stylistic, typographical, and mathematical errors have been corrected. The problems in complex analysis cover most of the principal topics in the theory of functions of a complex variable. The problems in the book cover, in real analysis: set algebra, measure and topology, real- and complex-valued functions, and topological vector spaces; in complex analysis: polynomials and power series, functions holomorphic in a region, entire functions, analytic continuation, singularities, harmonic functions, families of functions, and convexity theorems.

2010 ♦ 520 pp. ♦ Paperback
978-81-8489-627-5 ♦ ₹ 750.00

Proofs from THE BOOK (Fourth Edition)

Aigner, Martin & Ziegler, Günter M.

This revised and enlarged fourth edition of *Proofs from THE BOOK* features five new chapters, which treat classical results such as the fundamental theorem of algebra, problems about tilings, but also quite recent proofs, for example of the Kneser conjecture in graph theory. The new edition also presents further improvements and surprises, among them, a new proof for Hilbert's third problem.

2010 ♦ 282 pp. ♦ Paperback
978-81-8489-533-9 ♦ ₹ 450.00

Second Year Calculus: From Celestial Mechanics to Special Relativity

Bressoud, David M.

Second Year Calculus: From Celestial Mechanics to Special Relativity covers multi-variable and vector calculus, emphasizing the historical physical problems which gave rise to the concepts of calculus. The book guides us from the birth of the mechanized view of the world in Isaac Newton's *Mathematical Principles of Natural Philosophy* in which mathematics becomes the ultimate tool for modelling physical reality, to the dawn of a radically new and often counter-intuitive age in Albert Einstein's *Special Theory of Relativity* in which it is the mathematical model which suggests new aspects of that reality. The development of this process is discussed from the modern viewpoint of differential forms. Using this concept, the student learns to compute orbits and rocket trajectories, model flows and force fields, and derive the laws of electricity and magnetism. These exercises and observations of mathematical symmetry enable the student to better understand the interaction of physics and mathematics.

2010 ♦ 416 pp. ♦ Paperback
978-81-8489-622-0 ♦ ₹ 650.00

MATHEMATICS

Short Courses in Mathematics

Kumaresan, S.

This book is a collection of lectures delivered by the author at mathematics instructional workshops and refresher courses. Topics covered include the spectral theorem for operators in the finite dimensional case, Lebesgue integration theory via the Daniell method, Fourier transform on \mathbb{R} , solution of the Dirichlet problem for the potential equation in the plane by Perron's method, the Sturm–Liouville problem, the interior regularity of the solutions of elliptic equations and a thorough introduction to representation theory of topological groups.

2003 ♦ 136 pp. ♦ Paperback
978-81-7371-453-5 ♦ ₹ 175.00

Short Stories About Numbers

Kumar, Rajnish

Why is 11 eleven and not oneteen, and 12 twelve and not twoteen? Why of all bases, has this strange number 2.718... been chosen as the natural logarithm base called e ? Why does the computer use such a strange notation as F29 to denote 3881? These are questions that may have arisen in the curious minds of young learners. Here, by answering a few of these questions, the author brings out the innately fascinating quality of mathematics and its astonishing ability to explain many mysterious phenomena of nature. The material for Short Stories of Numbers has been collected by the author over years of adventuring in mathematics, motivated only by his love and passion for numbers and with the hope that it will serve as a friendly encouraging guiding post for other young adventurers.

2010 ♦ 200 pp. ♦ Paperback
978-81-7371-698-0 ♦ ₹ 275.00

Survey of Modern Algebra, A (Fifth Edition)

Garrett, Birkhoff & Mac Lane, Saunders

This classic text introduces abstract algebra using familiar and concrete examples that illustrate each concept as it is presented. It covers such topics as the role of careful proof in algebra; linear algebra as grounded in geometry; groups as expressions of symmetry; subgroups and subsystems leading to lattice theory; and much more. To develop the student's power to think for himself in terms of these new concepts, the authors have included a wide variety of exercises on each topic. Some of these exercises are computational, some explore further examples, and others give additional theoretical development. This fundamental text, now in its fifth edition, continues to show that the vital aspects of abstract algebra as they relate to the body of modern mathematics can be presented to undergraduates in an effective and innovative manner.

2003 ♦ 512 pp. ♦ Paperback
978-81-7371-445-0 ♦ ₹ 475.00

Theorems and Counterexamples in Mathematics

Gelbaum, Bernard R. & Olmsted, John M.H.

This text is intended to provide graduate and advanced undergraduate students as well as the general mathematical public with a modern treatment of various theorems and examples in mathematics. A carefully arranged mixture of theorems, examples, exercises, hints and discussions sharpens and highlights many of the fundamental aspects of the subject matter, and constitutes a rounding out and elaboration of the standard parts of algebra, analysis, geometry, logic, probability, set theory, and topology. Essentially self-contained, the book presents this material with a treatment sensitive to the progress mathematics has made in the last 25 years.

2010 ♦ 339 pp. ♦ Paperback
978-81-8489-543-8 ♦ ₹ 595.00

Topics in Abstract Algebra
(Second Edition)

Mukhopadhyay, P., Ghosh, Shamik, A.M. & Sen, Mridul Kanti

This book covers the elements of abstract algebra, which is a major mathematics course for undergraduate students all over the country and also for first year postgraduate students of many universities. It is designed according to the new UGC syllabus prescribed for all Indian universities.

Each chapter is divided into sections according to the needs of the subject and problems have been given at the end of every section under two categories: solved and unsolved.

The book is designed to satisfy the basic needs of a student with reference to the syllabus and examination. It begins without any prerequisite, then gradually unfolds the inner essence of the subject, its gradual development with a hint of history here and there, and tries to develop the flavour of abstraction from the proper perspective.

This edition has a complete chapters with workedout examples and exercises on Boolean algebra. the chinese remainder theorem Euler's Phi function has also been disussed in the appendix.

2004 ♦ 436 pp. ♦ Paperback
978-81-7371-551-8 ♦ ₹ 325.00

Trigonometric Delights

Maor, E.

Maor rejects the usual arid descriptions of the sine and cosine functions and their trigonometric relatives. He brings the subject to life in a compelling blend of mathematics, history, and biography. From the 'proto-trigonometry' of the Egyptian pyramid builders to Renaissance Europe's quest for more accurate artillery, from

the earliest known trigonometric table, carved on a clay tablet by an unknown Babylonian scholar, to Fourier's famous theorem, which finally explained the source of musical harmony, here is a rich tapestry of almost four thousand years of trigonometric history. Trigonometric Delights will change forever our view of a once-dreaded subject.

2000 ♦ 256 pp. ♦ Paperback
978-81-7371-206-7 ♦ ₹ 325.00

Ubiquitous Harmonic Relation, The

Metz, James

The harmonic relation, $1/a + 1/b = 1/c$, expresses a wonderful connection among three variables—the sum of the reciprocals of two variables being the reciprocal of the third. Unassumingly, this magnificent equation has made its presence felt in many and diverse applications such as optics, electric circuits and planetary motion. It finds expression in a variety of geometric figures. Many algebraic equations reduce to this simple statement. The author has taken it upon himself to illustrate the beauty and utility of this fascinating equation. By the end of the journey, the reader will realise the truly ubiquitous nature of the harmonic relation.

2008 ♦ 164 pp. ♦ Paperback
978-81-7371-603-4 ♦ Print on demand

Undergraduate Analysis

Lang, Serge

This is a logically self-contained introduction to analysis, suitable for students who have had two years of calculus. The book centers around those properties that have to do with uniform convergence and uniform limits in the context of differentiation and integration. Topics discussed include the classical test for convergence of series, Fourier series, polynomial approximation,

MATHEMATICS

the Poisson kernel, the construction of harmonic functions on the disc, ordinary differential equation, curve integrals, derivatives in vector spaces, multiple integrals, and others. One of the author's main concerns is to achieve a balance between concrete examples and general theorems, augmented by a variety of interesting exercises. Some new material has been added in this second edition, for example: a new chapter on the global version of integration of locally integrable vector fields; a brief discussion of L1-Cauchy sequences, introducing students to the Lebesgue integral; more material on Dirac sequences and families, including a section on the heat kernel; a more systematic discussion of orders of magnitude; and a number of new exercises.

2010 ♦ 688 pp. ♦ Paperback
978-81-8489-628-2 ♦ ₹ 850.00

Understanding Mathematics

Sinha, K.B., et al.

The book explains the 'hows' and 'whys' and also whets the appetite of a good student for more of good mathematics.

2000 ♦ 264 pp. ♦ Paperback
978-81-7371-355-2 ♦ ₹ 275.00

Understanding Probability and Statistics: A Book of Problems

Falk, Ruma

This is a book of creative statistical problems intended to allay the mathematical fears of the average students through 'experiencing the revelation of understanding'. The collection encompasses a range of problems from high school to graduate level and takes the active, hands-on approach to the assimilation of basic concepts. Through the use of humour and the familiar, the author has made an

often overwhelming subject less intimidating. Because neither calculus nor other techniques of higher mathematics are required for arriving at solutions, the book is quite appropriate for non-mathematicians. However, this text may be of benefit to the more mathematically inclined as well, because although technically elementary, it is conceptually advanced.

2003 ♦ 256 pp. ♦ Paperback
978-81-7371-440-5 ♦ ₹ 250.00

Universities Press Dictionary of Mathematics (Third Edition)

Daintith, J. & Clark, J.O.E. (Eds.)

Extensively revised and expanded, the dictionary contains approximately 3,000 entries that explain, clearly and concisely, the most important and commonly used terms in every branch of mathematics. More than 200 new terms increase coverage of applied mathematics and computer science. An extensive Appendix contains information about conversion factors and formulas. Almost 100 line drawings illustrate complex concepts, and extensive cross-references guarantee that no user will waste time searching for physical quantities, units of measure, conversion factors, formulas, important constants, and the Greek alphabets.

2000 ♦ 248 pp. ♦ Paperback
978-81-7371-300-2 ♦ ₹ 235.00

Wavelets: A Primer

Blatter, Christian

The wavelet transform, with its many applications, has become a major new mathematical technique. It has stimulated research unparalleled since the invention of the Fast Fourier Transform (FFT) and opened new avenues of application in signal processing, image compression, radiology, cardiology, and many other areas. It provides a

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solid, yet accessible, mathematical foundation for those interested in learning about wavelets and pursuing the broad range of applications for which the wavelet transform has proved successful. Numerous illustrations and fully worked-out examples further enhance the value of this exemplary introduction to the field.

2003 ♦ 216 pp. ♦ Paperback
978-81-7371-449-8 ♦ ₹ 250.00

Wavelets: Theory, Applications, Implementation

Altaisky, M.V.

This book aims at presenting a deductive scheme to show where and when the scale-invariance of Nature meets the representations of the affine group. It includes standard trends in wavelet analysis and discrete wavelet transform, some results obtained by the author in collaboration with different people in data processing, and a number of C++ programs which can be used by physicists, economists or biologists for the analysis of the time series. The general mathematical and physical ideas of wavelets are presented without sinking into details of elaborate numeric schemes; at the same time it enables the reader to solve wavelet-related problems on the computer. The book also contains some new ideas developed by the author for non-standard applications of wavelets in quantum mechanics, quantum field theory and biology.

2004 ♦ 164 pp. ♦ Paperback
978-81-7371-503-7 ♦ ₹ 250.00

When Least is Best: How Mathematicians Discovered Many Clever Ways to Make Things as Small (or as Large) as Possible

Nahin, Paul J.

What is the best way to photograph a speeding bullet? Why does light move through glass in the

least amount of time possible? How can lost hikers find their way out of a forest? What will rainbows look like in the future? Why do soap bubbles have a shape that gives them the least area?

By combining the mathematical history of extrema with contemporary examples, Paul J. Nahin answers these intriguing questions and more in this engaging and witty volume. Nahin tells the story of Dido's problem, Fermat and Descartes, Torricelli, Bishop Berkeley, Goldschmidt, and more.

This is the first book on optimisation written for a wide audience, and math enthusiasts of all backgrounds will delight in its lively topics.

2004 ♦ 392 pp. ♦ Paperback
978-81-7371-510-5 ♦ ₹ 395.00

Winning Solutions

Lozansky, Edward & Rousseau, Cecil

This book is intended to provide students with the appropriate mathematical tools and problem-solving experience to successfully compete in high-level problem solving competitions. In each section, the authors attempt to "fill in" the appropriate background and then provide the student with a variety of worked examples and exercises to help bridge the gap between what he or she may already know and what is required for high-level competitions. Answers or sketches of the solutions are given for all exercises. The book makes an attempt to introduce each area "gently", assuming little in the way of prior background—and teach the appropriate techniques, rather than simply providing a compilation of high-level problems.

2010 ♦ 270 pp. ♦ Paperback
978-81-8489-526-1 ♦ ₹ 495.00

MATHEMATICS

AMERICAN MATHEMATICAL SOCIETY
(INDIAN EDITION)

The American Mathematical Society (AMS) furthers the interests of mathematical research and scholarship worldwide through its publications. It fosters an awareness and appreciation of mathematics and its connections to other disciplines and everyday life.

The special Indian editions of AMS titles are distributed exclusively by Universities Press for the benefit of students, teachers and researchers.

NEW

1001 Problems in Classical Number Theory

Koninck, Jean-Marie De & Mercier, Armel

In the spirit of *The Book of the One Thousand and One Nights*, the authors offer 1001 problems in number theory in a way that entices the reader to immediately attack the next problem. Whether a novice or an experienced mathematician, anyone fascinated by numbers will find a great variety of problems—some simple, others more complex—that will provide them with a wonderful mathematical experience.

Contents:

Part 1: Key Elements from the Theory—Notations ❖ Some Classical Forms of Argument ❖ Inequalities ❖ Divisibility ❖ Prime Numbers ❖ Congruences ❖ The Function $[x]$ ❖ Arithmetical Functions ❖ Diophantine Equations ❖ Quadratic Reciprocity ❖ Continued Fractions ❖ Classification of Real Numbers ❖ Two Conjectures

Part 2: Statements of the Problems—Mathematical Induction and Combinatorics ❖ Divisibility ❖ Prime Numbers ❖ Representation of Numbers ❖ Congruences ❖ Primality Tests and Factorization Algorithms ❖ Integer Parts ❖ Arithmetical Functions ❖ Solving Equations Involving Arithmetical Functions ❖ Special Numbers ❖ Diophantine Equations ❖

Quadratic Reciprocity ❖ Continued Fractions ❖ Classification of Real Numbers
Part 3: Solutions—Bibliography ❖ Subject Index ❖ Index of Authors

2011 ♦ 352 pp. ♦ Paperback
978-0-8218-6888-1 ♦ ₹ 755.00

Abstract Algebra

Solomon, Ronald

At the heart of the text is a semi-historical journey through the early decades of the subject as it emerged in the revolutionary work of Euler, Lagrange, Gauss, and Galois. Avoiding excessive abstraction whenever possible, the text focuses on the central problem of studying the solutions of polynomial equations. Highlights include a proof of the Fundamental Theorem of Algebra, essentially due to Euler, and a proof of the constructability of the regular 17-gon, in the manner of Gauss. Another novel feature is the introduction of groups through a meditation on the meaning of congruence in the work of Euclid. Everywhere in the text, the goal is to make clear the links connecting abstract algebra to Euclidean geometry, high school algebra, and trigonometry. Another goal is to encourage students, insofar as possible in a textbook format, to build the course for themselves, with exercises integrally embedded in the text of each chapter.

2010 ♦ 240 pp. ♦ Paperback
978-0-8218-5210-1 ♦ ₹ 500.00

Advanced Calculus (Second Edition)

Fitzpatrick, Patrick M.

This book is self-contained and starts with the creation of basic tools using the completeness axiom. The continuity, differentiability, integrability, and power series representation properties of functions of a single variable are established. The next few chapters describe the topological and metric properties of Euclidean space. These are the basis of a rigorous treatment of differential calculus (including the Implicit Function Theorem and Lagrange Multipliers) for mappings between Euclidean spaces and integration for functions of several real variables.

Special attention has been paid to the motivation for proofs. Selected topics, such as the Picard Existence Theorem for differential equations, have been included in such a way that selections may be made while preserving a fluid presentation of the essential material. Supplemented with numerous exercises, *Advanced Calculus* is a perfect book for undergraduate students of analysis.

2010 ♦ 608 pp. ♦ Paperback
978-0-8218-5209-5 ♦ ₹ 1050.00

Algebra: A Graduate Course

Isaacs, Martin I.

This book, contains more than enough material for a two-semester graduate-level abstract algebra course, including groups, rings and modules, fields and Galois theory, an introduction to algebraic number theory, and the rudiments of algebraic geometry. This book could be used for self study as well as for a course text, and so full details of almost all proofs are included. There are hundreds of problems, many being far from trivial.

2010 ♦ 528 pp. ♦ Paperback
978-0-8218-5214-9 ♦ ₹ 895.00

Algebraic and Geometric Theory of Quadratic Forms, The

Elman, Richard, Karpenko, Nikita & Merkurjev, Alexander

This book is a comprehensive study of the algebraic theory of quadratic forms, from classical theory to recent developments, including results and proofs that have never been published. The book is written from the viewpoint of algebraic geometry and includes the theory of quadratic forms over fields of characteristic two, with proofs that are characteristic independent whenever possible. For some results both classical and geometric proofs are given. Part I includes classical algebraic theory of quadratic and bilinear forms and answers many questions that have been raised in the early stages of the development of the theory. Assuming only a basic course in algebraic geometry, Part II presents the necessary additional topics from algebraic geometry including the theory of Chow groups, Chow motives, and Steenrod operations. These topics are used in Part III to develop a modern geometric theory of quadratic forms.

Contents: Introduction;

Part 1: Classical theory of symmetric bilinear forms and quadratic Forms—Chapter I: Bilinear Forms ♦ Chapter II: Quadratic Forms ♦ Chapter III: Forms over Rational Function Fields ♦ Chapter IV: Function Fields of Quadrics ♦ Chapter V: Bilinear and Quadratic Forms and Algebraic Extensions ♦ Chapter VI: u-invariants ♦ Chapter VII: Applications of the Milnor Conjecture ♦ Chapter VIII: On the Norm Residue Homomorphism of Degree Two;
Part 2: Algebraic cycles—Chapter IX: Homology and Cohomology ♦ Chapter X: Chow Groups ♦ Chapter XI: Steenrod Operations ♦ Chapter XII: Category of Chow Motives;

Part 3: Quadratic forms and algebraic cycles—Chapter XIII: Cycles on Powers of Quadrics ♦ Chapter XIV: The Izhboldin Dimension ♦ Chapter XV: Application of Steenrod Operations ♦ Chapter XVI: The Variety of

MATHEMATICS

Maximal Totally Isotropic Subspaces ❖ Chapter XVII:
Motives of Quadrics ❖ Appendices ❖ Bibliography ❖
Notation ❖ Terminology

2011 ♦ 448 pp. ♦ Paperback
978-0-8218-6876-8 ♦ ₹ 895.00

Algebraic Curves and Riemann Surfaces

Miranda, Rick

In this book, Miranda takes the approach that algebraic curves are best encountered for the first time over the complex numbers, where the reader's classical intuition about surfaces, integration, and other concepts can be brought into play. Therefore, many examples of algebraic curves are presented in the first chapters. In this way, the book begins as a primer on Riemann surfaces, with complex charts and meromorphic functions taking center stage. But the main examples come from projective curves, and slowly but surely the text moves toward the algebraic category. Proofs of the Riemann- Roch and Serre Duality Theorems are presented in an algebraic manner, via an adaptation of the adelic proof, expressed completely in terms of solving a Mittag-Leffler problem. Sheaves and cohomology are introduced as a unifying device in the latter chapters, so that their utility and naturalness are immediately obvious. Requiring a background of one semester of complex variable theory and a year of abstract algebra, this is an excellent graduate textbook for a second-semester course in complex variables or a year-long course in algebraic geometry.

2010 ♦ 416 pp. ♦ Paperback
978-0-8218-5218-7 ♦ ₹ 950.00

NEW

Algebraic Geometry for Scientists and Engineers

Abhyankar, Shreeram S

This book, based on lectures presented in courses on algebraic geometry taught by the author at Purdue University, is intended for engineers and scientists (especially computer scientists), as well as graduate students and advanced undergraduates in mathematics. In addition to providing a concrete or algorithmic approach to algebraic geometry, the author also attempts to motivate and explain its link to more modern algebraic geometry based on abstract algebra. The book covers various topics in the theory of algebraic curves and surfaces, such as rational and polynomial parametrization, functions and differentials on a curve, branches and valuations, and resolution of singularities. The emphasis is on presenting heuristic ideas and suggestive arguments rather than formal proofs. Readers will gain new insight into the subject of algebraic geometry in a way that should increase appreciation of modern treatments of the subject, as well as enhance its utility in applications in science and industry.

Rational and polynomial parametrizations ❖
Fractional linear transformations ❖ Cubic curves
❖ Cubic surfaces and general hypersurfaces ❖
Outline of the theory of plane curves ❖ Affine
plane and projective plane ❖ Sphere with handles ❖
Functions and differentials on a curve ❖ Polynomials
and power series ❖ Review of abstract algebra ❖
Some commutative algebra ❖ Hensel's lemma and
Newton's theorem ❖ More about Newton's theorem ❖
Branches and valuations ❖ Divisors of functions and
differentials ❖ Weierstrass preparation theorem ❖
Intersection multiplicity ❖ Resolution of singularities
of plane curves ❖ Infinitely near singularities ❖
Parametrizing a quartic with three double points ❖
Characteristic pairs ❖ Criterion for one place and
Jacobian problem ❖ Inversion formula and Jacobian

problem ❖ Surfaces ❖ Hypersurfaces ❖ Resolution of singularities of algebraic surfaces ❖ Birational and polyrational transformations ❖ Valuations and birational correspondence ❖ Rational cylinders through a variety ❖ Resultants

2011 ♦ 312 pp. ♦ Paperback
978-0-8218-6894-2 ♦ ₹ 755.00

Algebraic Number Fields (Second Edition)

Janusz, Gerald J.

The book is directed toward students with a minimal background who want to learn class field theory for number fields. The only prerequisite for reading it is some elementary Galois theory. The first three chapters lay out the necessary background in number fields, such as the arithmetic of fields, Dedekind domains, and valuations. The next two chapters discuss class field theory for number fields. The concluding chapter serves as an illustration of the concepts introduced in previous chapters. In particular, some interesting calculations with quadratic fields show the use of the norm residue symbol.

For the second edition the author added some new material, expanded many proofs, and corrected errors found in the first edition. Janusz's book can be an excellent textbook for a year-long course in algebraic number theory; the first three chapters would be suitable for a one-semester course. It is also very suitable for independent study.

2010 ♦ 288 pp. ♦ Paperback
978-0-8218-5219-4 ♦ ₹ 675.00

Applied Linear Algebra: The Decoupling Principle (Second Edition)

Sadun, Lorenzo

Linear algebra permeates mathematics, as well as physics and engineering. In this text for junior and senior undergraduates, Sadun treats diagonalization as a central tool in solving complicated problems in these subjects by reducing coupled linear evolution problems to a sequence of simpler decoupled problems. This is the Decoupling Principle. Traditionally, difference equations, Markov chains, coupled oscillators, Fourier series, the wave equation, the Schrödinger equation, and Fourier transforms are treated separately, often in different courses. Here, they are treated as particular instances of the decoupling principle, and their solutions are remarkably similar. By understanding this general principle and the many applications given in the book, students will be able to recognize it and to apply it in many other settings. Sadun includes some topics relating to infinite-dimensional spaces. He does not present a general theory, but enough so as to apply the decoupling principle to the wave equation, leading to Fourier series and the Fourier transform.

The second edition contains a series of Explorations. Most are numerical labs in which the reader is asked to use standard computer software to look deeper into the subject. Some explorations are theoretical, for instance, relating linear algebra to quantum mechanics. There is also an appendix reviewing basic matrix operations and another with solutions to a third of the exercises.

Contents: Chapter 1: The Decoupling Principle ❖ Chapter 2: Vector Spaces and Bases ❖ Chapter 3: Linear Transformations and Operators ❖ Chapter 4: An Introduction to Eigenvalues ❖ Chapter 5: Some Crucial Applications ❖ Chapter 6: Inner Products ❖ Chapter 7: Adjoints, Hermitian Operators, and

MATHEMATICS

Unitary Operators ❖ Chapter 8: The Wave Equation
❖ Chapter 9: Continuous Spectra and the Dirac
Delta Function ❖ Chapter 10: Fourier Transforms
❖ Chapter 11: Green's Functions ❖ Appendix A ❖
Appendix B ❖ Index

2011 ♦ 392 pp. ♦ Paperback
978-0-8218-6887-4 ♦ ₹ 755.00

Companion to Analysis, A: A Second First and First Second Course in Analysis

Körner, T W

Many students acquire knowledge of a large number of theorems and methods of calculus without being able to say how they work together. This book provides those students with the coherent account that they need. A Companion to Analysis explains the problems that must be resolved in order to procure a rigorous development of the calculus and shows the student how to deal with those problems. Starting with the real line, the book moves on to finite-dimensional spaces and then to metric spaces. Readers who work through this text will be ready for courses such as measure theory, functional analysis, complex analysis, and differential geometry. Moreover, they will be well on the road that leads from mathematics student to mathematician. With this book, well-known author Thomas Körner provides able and hard-working students a great text for independent study or for an advanced undergraduate or first-level graduate course. It includes many stimulating exercises. An appendix contains a large number of accessible but non-routine problems that will help students advance their knowledge and improve their technique.

The real line ❖ A first philosophical interlude ❖ Other versions of the fundamental axiom ❖ Higher dimensions ❖ Sums and suchlike ❖ Differentiation ❖ Local Taylor theorems ❖ The Riemann integral ❖ Developments and limitations of the Riemann integral ❖ Metric spaces ❖ Complete metric spaces ❖ Contraction mappings and

differential equations ❖ Inverse and implicit functions
❖ Completion ❖ Appendices ❖ Executive summary
❖ Exercises ❖ Bibliography ❖ Index

2011 ♦ 608 pp. ♦ Paperback
978-0-8218-6878-2 ♦ ₹ 1,175.00

Concepts in Abstract Algebra

Lanski, Charles

The style and structure of Concepts in Abstract Algebra are designed to help students learn the core concepts and associated techniques in algebra deeply and well. The book presents interesting examples of sufficient complexity so that students can see the concepts and results used in a nontrivial setting. Charles Lanski gives students the opportunity to practice by offering many exercises that require the use and synthesis of the techniques and results. Both readable and mathematically interesting, the text also helps students learn the art of constructing mathematical arguments.

2010 ♦ 560 pp. ♦ Paperback
978-0-8218-5212-5 ♦ ₹ 925.00

Course in Algebra, A

Vinberg, E. B.

This is a comprehensive textbook on modern algebra written by an internationally renowned specialist. It covers material traditionally found in advanced undergraduate and basic graduate courses and presents it in a lucid style. The author includes almost no technically difficult proofs, and reflecting his point of view on mathematics, he tries wherever possible to replace calculations and difficult deductions with conceptual proofs and to associate geometric images to algebraic objects. The effort spent on the part of students in absorbing these ideas will pay off when they turn to solving problems outside of this textbook. Another important feature is the

presentation of most topics on several levels, allowing students to move smoothly from initial acquaintance with the subject to thorough study and a deeper understanding. Basic topics are included, such as algebraic structures, linear algebra, polynomials, and groups, as well as more advanced topics, such as affine and projective spaces, tensor algebra, Galois theory, Lie groups, and associative algebras and their representations. Some applications of linear algebra and group theory to physics are discussed. The book is written with extreme care and contains over 200 exercises and 70 figures. It is ideal as a textbook and also suitable for independent study for advanced undergraduates and graduate students.

2009 ♦ 511 pp. ♦ Paperback
978-0-8218-4858-6 ♦ ₹ 995.00

Cryptography: An Introduction

Yaschenko V.V.

Learning about cryptography requires examining fundamental issues about information security. Questions abound, ranging from "From whom are we protecting ourselves?" and "How can we measure levels of security?" to "What are our opponent's capabilities?" and "What are their goals?" Answering these questions requires and understanding of basic cryptography. This book, written by Russian cryptographers, explains those basics.

Chapters are independent and can be read in any order. The introduction gives a general description of all the main notions of modern cryptography: a cipher, a key, security, and electronic digital signature, a cryptographic protocol, etc. Other chapters delve more deeply into this material. The final chapter presents problems and selected solutions from *Cryptography Olympiads for (Russian) High School Students*.

This is an English translation of a Russian textbook. It is suitable for advanced high school students and undergraduates studying information

security. It is also appropriate for a general mathematical audience interested in cryptography.

2009 ♦ 240 pp. ♦ Paperback
978-0-8218-4850-0 ♦ ₹ 600.00

NEW

Curves and Surfaces (Second Edition)

Montiel, Sebastián & Ros, Antonio

This introductory textbook puts forth a clear and focused point of view on the differential geometry of curves and surfaces. Following the modern point of view on differential geometry, the book emphasizes the global aspects of the subject. The excellent collection of examples and exercises (with hints) will help students in learning the material. Advanced undergraduates and graduate students will find this a nice entry point to differential geometry. In order to study the global properties of curves and surfaces, it is necessary to have more sophisticated tools than are usually found in textbooks on the topic. In particular, students must have a firm grasp on certain topological theories. Indeed, this monograph treats the Gauss-Bonnet theorem and discusses the Euler characteristic. The authors also cover Alexandrov's theorem on embedded compact surfaces in \mathbb{R}^3 with constant mean curvature. The last chapter addresses the global geometry of curves, including periodic space curves and the four-vertices theorem for plane curves that are not necessarily convex. Besides being an introduction to the lively subject of curves and surfaces, this book can also be used as an entry to a wider study of differential geometry. It is suitable as the text for a first-year graduate course or an advanced undergraduate course.

Contents: Chapter 1: Plane and Space Curves ♦ Chapter 2: Surfaces in Euclidean Space ♦ Chapter 3: The Second Fundamental Form ♦ Chapter 4:

MATHEMATICS

Separation and Orientability ❖ Chapter 5: Integration on Surfaces ❖ Chapter 6: Global Extrinsic Geometry ❖ Chapter 7: Intrinsic Geometry of Surfaces ❖ Chapter 8: The Gauss-Bonnet Theorem ❖ Chapter 9: Global Geometry of Curves ❖ Bibliography ❖ Index

2011 ♦ 392 pp. ♦ Paperback
978-0-8218-6880-5 ♦ ₹ 720.00

Differential Geometry, Lie Groups, and Symmetric Spaces

Helgason, Sigurdur

For many years and for many mathematicians, Sigurdur Helgason's classic has been—and continues to be—the standard source for this material.

Helgason begins with a concise, self-contained introduction to differential geometry. He then introduces Lie groups and Lie algebras, including important results on their structure. This sets the stage for the introduction and study of symmetric spaces, which form the central part of the book. The text concludes with the classification of symmetric spaces by means of the Killing-Cartan classification of simple Lie algebras over \mathbb{C} and Cartan's classification of simple Lie algebras over \mathbb{R} .

The excellent exposition is supplemented by extensive collections of useful exercises at the end of each chapter. All the problems have either solutions or substantial hints, found at the back of the book. For this latest edition, Helgason has made corrections and added helpful notes and useful references.

Sigurdur Helgason was awarded the Steele Prize for Differential Geometry, Lie Groups, and Symmetric Spaces and Groups and Geometric Analysis.

2010 ♦ 668 pp. ♦ Paperback
978-0-8218-5217-0 ♦ ₹ 1195.00

NEW

Finite Group Theory

Isaacs, Martin

The text begins with a review of group actions and Sylow theory. It includes semidirect products, the Schur-Zassenhaus theorem, the theory of commutators, coprime actions on groups, transfer theory, Frobenius groups, primitive and multiply transitive permutation groups, the simplicity of the PSL groups, the generalized Fitting subgroup and also Thompson's J -subgroup and his normal p -complement theorem.

Topics that seldom (or never) appear in books are also covered. These include subnormality theory, a group-theoretic proof of Burnside's theorem about groups with order divisible by just two primes, the Wielandt automorphism tower theorem, Yoshida's transfer theorem, the "principal ideal theorem" of transfer theory and many smaller results that are not very well known.

Proofs often contain original ideas, and they are given in complete detail. In many cases they are simpler than can be found elsewhere. The book is largely based on the author's lectures, and consequently, the style is friendly and somewhat informal. Finally, the book includes a large collection of problems at disparate levels of difficulty. These should enable students to practice group theory and not just read about it.

Contents: Chapter 1: Sylow Theory ❖ Chapter 2: Subnormality ❖ Chapter 3: Split Extensions ❖ Chapter 4: Commutators ❖ Chapter 5: Transfer ❖ Chapter 6: Frobenius Actions ❖ Chapter 7: The Thompson Subgroup ❖ Chapter 8: Permutation Groups ❖ Chapter 9: More on Subnormality ❖ Chapter 10: Appendix: The Basics ❖ Index

2011 ♦ 364pp. ♦ Paperback
978-0-8218-6884-3 ♦ ₹ 755.00

First Course in Topology, A: Continuity and Dimension

McCleary, John

How many dimensions does our universe require for a comprehensive physical description? In 1905, Poincaré argued philosophically about the necessity of the three familiar dimensions, while recent research is based on 11 dimensions or even 23 dimensions. The notion of dimension itself presented a basic problem to the pioneers of topology. Cantor asked if dimension was a topological feature of Euclidean space. To answer this question, some important topological ideas were introduced by Brouwer, giving shape to a subject whose development dominated the twentieth century. The basic notions in topology are varied and a comprehensive grounding in point-set topology, the definition and use of the fundamental group, and the beginnings of homology theory requires considerable time. The goal of this book is a focused introduction through these classical topics, aiming throughout at the classical result of the Invariance of Dimension. This text is based on the author's course given at Vassar College and is intended for advanced undergraduate students. It is suitable for a semester-long course on topology for students who have studied real analysis and linear algebra. It is also a good choice for a capstone course, senior seminar, or independent study.

Contents: Introduction ❖ Chapter 1: A Little Set Theory ❖ Chapter 2: Metric and Topological Spaces ❖ Chapter 3: Geometric Notions ❖ Chapter 4: Building New Spaces from Old ❖ Chapter 5: Connectedness ❖ Chapter 6: Compactness ❖ Chapter 7: Homotopy and the Fundamental Group ❖ Chapter 8: Computations and Covering Spaces ❖ Chapter 9: The Jordan Curve Theorem ❖ Chapter 10: Simplicial Complexes ❖ Chapter 11: Homology ❖ Bibliography ❖ Notation Index ❖ Subject Index

2011 ♦ 224 pp. ♦ Paperback
978-0-8218-6893-5 ♦ ₹ 475.00

Foundations of Mechanics (Second Edition)

Abraham, Ralph & Marsden, Jerrold E

For many years, this book has been viewed as a classic treatment of geometric mechanics. It is known for its broad exposition of the subject, with many features that cannot be found elsewhere. The book is recommended as a textbook and as a basic reference work for the foundations of differentiable and Hamiltonian dynamics.

Contents:

Part 1: Preliminaries—Chapter 1: Differential Theory ❖ Chapter 2: Calculus on Manifolds
 Part 2: Analytical Dynamics—Chapter 3: Hamiltonian and Lagrangian Systems ❖ Chapter 4: Hamiltonian Systems with Symmetry ❖ Chapter 5: Hamiltonian-Jacobi Theory and Mathematical Physics
 Part 3: An outline of Qualitative Dynamics—Chapter 6: Topological Dynamics ❖ Chapter 7: Differentiable Dynamics ❖ Chapter 8: Hamiltonian Dynamics
 Part 4: Celestial Mechanics—Chapter 9: The Two-Body Problem ❖ Chapter 10: The Three-Body Problem ❖ Appendix ❖ Bibliography ❖ Index ❖ Glossary of Symbols ❖ Errata

2011 ♦ 852 pp. ♦ Paperback
978-0-8218-6875-1 ♦ ₹ 1,375.00

Fourier Analysis and Its Applications

Folland, Gerald B.

This book presents the theory and applications of Fourier series and integrals, eigenfunction expansions, and related topics, on a level suitable for advanced undergraduates. It includes material on Bessel functions, orthogonal polynomials, and Laplace transforms, and it concludes with chapters on generalized functions and Green's functions for ordinary and partial differential equations. The book deals almost exclusively with aspects of these subjects that are useful in physics and engineering, and includes a wide variety of applications. On the theoretical side, it

MATHEMATICS

uses ideas from modern analysis to develop the concepts and reasoning behind the techniques without getting bogged down in the technicalities of rigorous proofs.

2010 ♦ 433 pp. ♦ Paperback
978-0-8218-5208-8 ♦ ₹ 950.00

NEW

Function Theory of One Complex Variable (Third Edition)

Greene, Robert E & Krantz, Steven G

Complex analysis is one of the most central subjects in mathematics. It is compelling and rich in its own right, but it is also remarkably useful in a wide variety of other mathematical subjects, both pure and applied. This book is different from others in that it treats complex variables as a direct development from multivariable real calculus. As each new idea is introduced, it is related to the corresponding idea from real analysis and calculus. The text is rich with examples and exercises that illustrate this point. The authors have systematically separated the analysis from the topology, as can be seen in their proof of the Cauchy theorem. The book concludes with several chapters on special topics, including full treatments of special functions, the prime number theorem, and the Bergman kernel. The authors also treat H^p spaces and Painlevé's theorem on smoothness to the boundary for conformal maps. This book is a text for a first-year graduate course in complex analysis. It is an engaging and modern introduction to the subject, reflecting the authors' expertise both as mathematicians and as expositors.

Contents: Chapter 1: Fundamental Concepts ♦ Chapter 2: Complex Line Integrals ♦ Chapter 3: Applications of the Cauchy Integral ♦ Chapter 4: Meromorphic Functions and Residues ♦ Chapter 5:

The Zeros of a Holomorphic Function ♦ Chapter 6: Holomorphic Functions as Geometric Mappings ♦ Chapter 7: Harmonic Functions ♦ Chapter 8: Infinite Series and Products ♦ Chapter 9: Applications of Infinite Sums and Products ♦ Chapter 10: Analytic Continuation ♦ Chapter 11: Topology ♦ Chapter 12: Rational Approximation Theory ♦ Chapter 13: Special Classes of Holomorphic Functions ♦ Chapter 14: Hilbert Spaces of Holomorphic Functions, the Bergman Kernel, and Biholomorphic Mappings ♦ Chapter 15: Special Functions ♦ Chapter 16: The Prime Number Theorem ♦ APPENDIX A: Real Analysis ♦ APPENDIX B: The Statement and Proof of Goursat's Theorem ♦ References ♦ Index

2011 ♦ 528 pp. ♦ Paperback
978-0-8218-6877-5 ♦ ₹ 895.00

Functional Analysis: An Introduction

Eidelman, Yuli, Milman, Vitali & Tsolomitis,
Antonis

This textbook provides an introduction to the methods and language of functional analysis, including Hilbert spaces, Fredholm theory for compact operators, and spectral theory of self-adjoint operators. It also presents the basic theorems and methods of abstract functional analysis and a few applications of these methods to Banach algebras and the theory of unbounded self-adjoint operators. The text corresponds to material for two semester courses (Part I and Part II, respectively) and is essentially self-contained. Prerequisites for the first part are minimal amounts of linear algebra and calculus. For the second part, some knowledge of topology and measure theory is recommended. Each of the 11 chapters is followed by numerous exercises, with solutions given at the end of the book. The text is ideal for a one-year course. It will also provide a sound basis for further study. It is suitable for graduate students and researchers interested in operator theory and functional analysis.

Contents: Hilbert spaces and basic operator theory—Linear spaces ❖ normed spaces ❖ first examples ❖ Hilbert spaces ❖ The dual space ❖ Bounded linear operators ❖ Spectrum ❖ Fredholm theory of compact operators ❖ Self-adjoint operators ❖ Functions of operators ❖ spectral decomposition ❖ Basics of functional analysis—Spectral theory of unitary operators ❖ The fundamental theorems and the basic methods ❖ Banach algebras ❖ Unbounded self-adjoint and symmetric operators in \mathcal{H} ❖ Solutions to exercises ❖ Bibliography ❖ Symbols index ❖ Subject index

2011 ♦ 344 pp. ♦ Paperback
978-0-8218-6879-9 ♦ ₹ 755.00

Geometric Analysis on Symmetric Spaces

Helgason, Sigurdur

This book gives the first systematic exposition of geometric analysis on Riemannian symmetric spaces and its relationship to the representation theory of Lie groups. The book starts with modern integral geometry for double fibrations and treats several examples in detail. After discussing the theory of Radon transforms and Fourier transforms on symmetric spaces, inversion formulas, and range theorems, Helgason examines applications to invariant differential equations on symmetric spaces, existence theorems, and explicit solution formulas, particularly potential theory and wave equations. The canonical multitemporal wave equation on a symmetric space is included. The book concludes with a chapter on eigenspace representations—that is, representations on solution spaces of invariant differential equations. Known for his high-quality expositions, Helgason received the 1988 Steele Prize for his earlier books *Differential Geometry, Lie Groups and Symmetric Spaces* and *Groups and Geometric Analysis*. Containing exercises (with solutions) and references to further results, this revised edition would be suitable for advanced graduate courses in modern integral geometry, analysis on Lie groups, and representation theory of Lie groups.

www.universitiespress.com

Contents: Chapter I: A Duality in Integral Geometry ❖ Chapter II: A Duality for Symmetric Spaces ❖ Chapter III: The Fourier Transform on a Symmetric Space ❖ Chapter IV: The Radon Transform on X and on X_0 ❖ Chapter V: Differential Equations on Symmetric Spaces ❖ Chapter VI: Eigenspace Representations ❖ Solutions to Exercises ❖ Bibliography ❖ Symbols Frequently Used ❖ Index

2011 ♦ 656 pp. ♦ Paperback
978-0-8218-6895-9 ♦ ₹ 995.00

Geometry of Differential Forms

Morita, Shigeyuki

Since the times of Gauss, Riemann, and Poincaré, one of the principal goals of the study of manifolds has been to relate local analytic properties of a manifold with its global topological properties. Among the high points on this route are the Gauss – Bonnet formula, the de Rham complex, and the Hodge theorem: these results show, in particular, that the central tool in reaching the main goal of global analysis is the theory of differential forms. This book is a comprehensive introduction to differential forms. It begins with a quick presentation of the notion of differentiable manifolds and then develops basic properties of differential forms as well as fundamental results about them, such as the de Rham and Frobenius theorems. The second half of the book is devoted to more advanced material, including Laplacians and harmonic forms on manifolds, the concepts of vector bundles and fibre bundles and the theory of characteristic classes. Among the less traditional topics treated in the book is a detailed description of the Chern – Weil theory. With the minimal prerequisites, the book can serve as a textbook for an advanced undergraduate or a graduate course in differential geometry.

2009 ♦ 352 pp. ♦ Paperback
978-0-8218-4852-4 ♦ ₹ 720.00

MATHEMATICS

Global Calculus

Ramanan, S.

Analysis, topology and algebra brought new power to geometry, revolutionising the way geometers and physicists look at conceptual problems. Some of the key ingredients in this interplay are sheaves, cohomology, Lie groups, connections and differential operators. In *Global Calculus*, the appropriate formalism for these topics is laid out with numerous examples and applications by one of the experts in differential and algebraic geometry. Ramanan has chosen an uncommon but natural path through the subject. In this almost completely self-contained account, these topics are developed from scratch. The basics of Fourier transforms, Sobolev theory and interior regularity are proved at the same time as symbol calculus, culminating in beautiful results in global analysis, real and complex. Many new perspectives on traditional and modern questions of differential analysis and geometry are the hallmarks of the book. The book is suitable for a first year graduate course on global analysis.

2009 ♦ 328 pp. ♦ Paperback
978-0-8218-4860-9 ♦ ₹ 675.00

Graduate Algebra: Commutative View

Rowen, Louis Halle

This book is an expanded text for a graduate course in commutative algebra, focusing on the algebraic underpinnings of algebraic geometry and of number theory. Accordingly, the theory of affine algebras is featured, treated both directly and via the theory of Noetherian and Artinian modules, and the theory of graded algebras is included to provide the foundation for projective varieties. Major topics include the theory of modules over a principal ideal domain, and its applications to matrix theory (including the Jordan decomposition), the Galois theory

of field extensions, transcendence degree, the prime spectrum of an algebra, localization, and the classical theory of Noetherian and Artinian rings. Later chapters include some algebraic theory of elliptic curves (featuring the Mordell-Weil theorem) and valuation theory, including local fields.

2010 ♦ 456 pp. ♦ Paperback
978-0-8218-5220-0 ♦ ₹ 975.00

Hamilton's Ricci Flow

Chow, Bennett et al.

Ricci flow is a powerful analytic method for studying the geometry and topology of manifolds. This book is an introduction to Ricci flow for graduate students and mathematicians interested in working in the subject. To this end, the first chapter is a review of the relevant basics of Riemannian geometry. For the benefit of the student, the text includes a number of exercises of varying difficulty.

The book also provides brief introductions to some general methods of geometric analysis and other geometric flows. Comparisons are made between the Ricci flow and the linear heat equation, mean curvature flow, and other geometric evolution equations whenever possible.

Several topics of Hamilton's program are covered, such as short time existence, Harnack inequalities, Ricci solutions, Perelman's no local collapsing theorem, singularity analysis, and ancient solutions.

A major direction in Ricci flow, via Hamilton's and Perelman's works, is the use of Ricci flow as an approach to solving the Poincaré conjecture and Thurston's geometrization conjecture.

2010 ♦ 646 pp. ♦ Paperback
978-0-8218-5221-7 ♦ ₹ 1195.00

Introduction to Analysis (Fifth Edition)

Gaughan, Edward D.

Introduction to Analysis is designed to bridge the gap between the intuitive calculus usually offered at the undergraduate level and the sophisticated analysis courses the student encounters at the graduate level. A considerable amount of time is spent motivating the theorems and proofs and developing the reader's intuition. The topics are quite standard: convergence of sequences, limits of functions, continuity, differentiation, the Riemann integral, infinite series, power series, and convergence of sequences of functions. Many examples are given to illustrate the theory, and exercises at the end of each chapter are keyed to each section. Also, at the end of each section, one finds several Projects. The purpose of a Project is to give the reader a substantial mathematical problem and the necessary guidance to solve that problem. A Project is distinguished from an exercise in that the solution of a Project is a multi-step process requiring assistance for the beginner student.

2010 ♦ 256 pp. ♦ Paperback
978-0-8218-5206-4 ♦ ₹ 595.00

Introduction to Probability
 (Second Edition)

Grinstead, Charles M. & Snell, J. Laurie

This text is designed for an introductory probability course at the university level for sophomores, juniors, and seniors in mathematics, physical and social sciences, engineering, and computer science. It presents a thorough treatment of ideas and techniques necessary for a firm understanding of the subject.

The text is also recommended for use in discrete probability courses. The material is organised so that the discrete and continuous probability discussions are presented

in a separate, but parallel, manner. This organisation does not emphasise an overly rigorous or formal view of probability and therefore offers some strong pedagogical value. Hence, the discrete discussions can sometimes serve to motivate the more abstract continuous probability discussions.

Special features: ♦ Key ideas are developed in a somewhat leisurely style, providing a variety of interesting applications to probability and showing some non-intuitive ideas. ♦ Over 600 exercises provide the opportunity for practising skills and developing a sound understanding of ideas. ♦ Numerous historical comments deal with the development of discrete probability.

2009 ♦ 528 pp. ♦ Paperback
978-0-8218-4857-9 ♦ ₹ 995.00

NEW

Introduction to the Mathematics of Finance

Williams, R J

The modern subject of mathematical finance has undergone considerable development, both in theory and practice, since the seminal work of Black and Scholes appeared a third of a century ago. This book is intended as an introduction to some elements of the theory that will enable students and researchers to go on to read more advanced texts and research papers. The book begins with the development of the basic ideas of hedging and pricing of European and American derivatives in the discrete (i.e., discrete time and discrete state) setting of binomial tree models. Then a general discrete finite market model is introduced, and the fundamental theorems of asset pricing are proved in this setting. Tools from probability such as conditional expectation, filtration, (super) martingale, equivalent martingale measure, and martingale representation are all used first in this simple discrete framework. This provides a bridge

MATHEMATICS

to the continuous (time and state) setting, which requires the additional concepts of Brownian motion and stochastic calculus. The simplest model in the continuous setting is the famous Black-Scholes model, for which pricing and hedging of European and American derivatives are developed. The book concludes with a description of the fundamental theorems for a continuous market model that generalizes the simple Black-Scholes model in several directions.

Contents: Chapter 1: Financial Markets and Derivatives ❖ Chapter 2: Binomial Model ❖ Chapter 3: Finite Market Model ❖ Chapter 4: Black-Scholes Model ❖ Chapter 5: Multi-dimensional Black-Scholes Model ❖ Appendix A: Conditional Expectation and Lp-Spaces ❖ Appendix B: Discrete Time Stochastic Processes ❖ Appendix C: Continuous Time Stochastic Processes ❖ Appendix D: Brownian Motion and Stochastic Integration ❖ Bibliography ❖ Index

2011 ♦ 160 pp. ♦ Paperback
978-0-8218-6882-9 ♦ ₹ 465.00

Mathematical Modelling: A Case Studies Approach

Illner, Reinhard et.al.

Mathematical Modelling is a subject without boundaries. It is the means by which mathematics becomes useful to virtually any subject. Moreover, modelling has been and continues to be a driving force for the development of mathematics itself. This book explains the process of modelling real situations to obtain mathematical problems that can be analyzed, thus solving the original problem. The presentation is in the form of case studies, which are developed much as they would be in true applications. In many cases, an initial model is created, then modified along the way. Some cases are familiar, such as the evaluation of an annuity. Others are unique, such as the fascinating situation in which an engineer, armed only with a slide rule, had 24 hours to compute whether a valve would hold when a temporary rock plug was removed from a water tunnel.

Each chapter ends with a set of exercises and some suggestions for class projects. Some projects are extensive, as with the explorations of the predator-prey model; others are more modest. The text was designed to be suitable for a one-term course for advanced undergraduates. The selection of topics and the style of exposition reflect this choice. The authors have also succeeded in demonstrating just how enjoyable the subject can be. This is an ideal text for classes on modelling. It can also be used in seminars or as preparation for mathematical modelling competitions.

Contents: Crystallization dynamics ❖ Will the valve hold? ❖ How much will that annuity cost me? ❖ Dimensional analysis ❖ Predator-prey systems ❖ A control problem in fishery management ❖ Formal justice ❖ Traffic dynamics: A microscopic model ❖ Traffic dynamics: Macroscopic modelling ❖ Bibliography

2011 ♦ 216 pp. ♦ Paperback
978-0-8218-6891-1 ♦ ₹ 450.00

Mathematical Omnibus: Thirty Lectures on Classic Mathematics

Fuchs, Dmitry & Tabachnikov, Serge

The book consists of thirty lectures on diverse topics, covering much of the mathematical landscape rather than focusing on one area. The reader will learn numerous results that often belong to neither the standard undergraduate nor graduate curriculum and will discover connections between classical and contemporary ideas in algebra, combinatorics, geometry, and topology. The reader's effort will be rewarded in seeing the harmony of each subject. The common thread in the selected subjects is their illustration of the unity and beauty of mathematics. Most lectures contain exercises, and solutions or answers are given to selected exercises. A special feature of the book is an abundance of drawings (more than four hundred), artwork by an award-winning artist, and about a hundred portraits of

mathematicians. Almost every lecture contains surprises for even the seasoned researcher.

Contents: Chapter 1: Arithmetic and Combinatorics
 ❖ Chapter 2: Equations ❖ Chapter 3: Envelopes and Singularities ❖ Chapter 4: Developable Surfaces ❖ Chapter 5: Straight Lines ❖ Chapter 6: Polyhedra ❖ Chapter 7: Two Surprising Topological Constructions ❖ Chapter 8: On Ellipses and Ellipsoids ❖ Bibliography ❖ Index

2011 ♦ 480 pp. ♦ Paperback
 978-0-8218-6885-0 ♦ ₹ 895.00

Matrix Groups for Undergraduates

Tapp, Kristophe

Matrix groups are a beautiful subject and are central to many fields in mathematics and physics. They touch upon an enormous spectrum within the mathematical arena. This textbook brings them into the undergraduate curriculum. It is excellent for a one-semester course for students familiar with linear and abstract algebra and prepares them for a graduate course on Lie groups. Matrix Groups for Undergraduates is concrete and example-driven, with geometric motivation and rigorous proofs. The story begins and ends with the rotations of a globe. In between, the author combines rigor and intuition to describe basic objects of Lie theory: Lie algebras, matrix exponentiation, Lie brackets, and maximal tori. The volume is suitable for graduate students and researchers interested in group theory.

Contents: Why study matrix groups? ❖ Matrices ❖ All matrix groups are real matrix groups ❖ The orthogonal groups ❖ The topology of matrix groups ❖ Lie algebras ❖ Matrix exponentiation ❖ Matrix groups are manifolds ❖ The Lie bracket ❖ Maximal tori ❖ Bibliography ❖ Index

2011 ♦ 176 pp. ♦ Paperback
 978-0-8218-6892-8 ♦ ₹ 450.00

Modern Theory of Integration, A

Bartle, Robert G.

The theory of integration is one of the twin pillars on which analysis is built. The first version of integration that students see is the Riemann integral. Later, graduate students learn that the Lebesgue integral is “better” because it removes some restrictions on the integrands and the domains over which we integrate. However, there are still drawbacks to Lebesgue integration, for instance, dealing with the Fundamental Theorem of Calculus, or with “improper” integrals.

This book is an introduction to a relatively new theory of the integral (called the “generalized Riemann integral” or the “Henstock-Kurzweil integral”) that corrects the defects in the classical Riemann theory and both simplifies and extends the Lebesgue theory of integration. Although this integral includes that of Lebesgue, its definition is very close to the Riemann integral that is familiar to students from calculus. One virtue of the new approach is that no measure theory and virtually no topology is required. Indeed, the book includes a study of measure theory as an application of the integral.

Part 1 fully develops the theory of the integral of functions defined on a compact interval. This restriction on the domain is not necessary, but it is the case of most interest and does not exhibit some of the technical problems that can impede the reader’s understanding.

Part 2 shows how this theory extends to functions defined on the whole real line. The theory of Lebesgue measure from the integral is then developed, and the author makes a connection with some of the traditional approaches to the Lebesgue integral. Thus, readers are given full exposure to the main classical results.

The text is suitable for a first-year graduate course, although much of it can be readily mastered by advanced undergraduate students. Included are many examples and a very rich

MATHEMATICS

collection of exercises. There are partial solutions to approximately one-third of the exercises. A complete solutions manual is available separately.

2010 ♦ 472 pp. ♦ Paperback
978-0-8218-5215-6 ♦ ₹ 895.00

Solutions Manual to A Modern Theory of Integration

Bartle, Robert G.

2010 ♦ 80 pp. ♦ Paperback
978-0-8218-5216-3

Number Theory

Kumar Murty, V. & Waldschmidt, Michel

To observe the tenth anniversary of the founding of the Ramanujan Mathematical Society, an international conference on Discrete Mathematics and Number Theory was held in January 1996 in Tiruchirapalli, India. This volume contains the proceedings from the number theory component of that conference. Papers are divided into four groups: arithmetic algebraic geometry, automorphic forms, elementary and analytic number theory and transcendental number theory. This work deals with recent progress in current aspects of number theory and covers a wide variety of topics.

2009 ♦ 408 pp. ♦ Paperback
978-0-8218-4861-6 ♦ ₹ 750.00

Numerical Analysis: Mathematics of Scientific Computing (Third Edition)

Kincaid, David & Cheney, Ward

This book introduces students with diverse backgrounds to various types of mathematical analysis that are commonly needed in scientific computing. The subject of numerical analysis

is treated from a mathematical point of view, offering a complete analysis of methods for scientific computing with appropriate motivations and careful proofs.

In an engaging and informal style, the authors demonstrate that many computational procedures and intriguing questions of computer science arise from theorems and proofs. Algorithms are presented in pseudo code, so that students can immediately write computer programs in standard languages or use interactive mathematical software packages.

2010 ♦ 788 pp. ♦ Paperback
978-0-8218-5207-1 ♦ ₹ 1375.00

p-adic Analysis Compared with Real

Katok, Svetlana

The book gives an introduction to p-adic numbers from the point of view of number theory, topology, and analysis. Compared to other books on the subject, its novelty is both a particularly balanced approach to these three points of view and an emphasis on topics accessible to undergraduates. In addition, several topics from real analysis and elementary topology which are not usually covered in undergraduate courses (totally disconnected spaces and Cantor sets, points of discontinuity of maps and the Baire Category Theorem, surjectivity of isometries of compact metric spaces) are also included in the book. They will enhance the reader's understanding of real analysis and intertwine the real and p-adic contexts of the book.

The choice of the topic was motivated by the internal beauty of the subject of p-adic analysis, an unusual one in the undergraduate curriculum, and abundant opportunities to compare it with its much more familiar real counterpart. The book includes a large number of exercises. Answers, hints, and solutions for most of them appear at

the end of the book. The book can be successfully used in a topic course or for self-study.

2010 ♦ 168 pp. ♦ Paperback
978-0-8218-5224-8 ♦ ₹ 475.00

Partial Differential Equations

Evans, Lawrence C.

This text gives a comprehensive survey of modern techniques in the theoretical study of partial differential equations (PDEs), with particular emphasis on nonlinear equations. The exposition is divided into three parts: 1) representation formulas for solutions, 2) theory for linear partial differential equations, and 3) theory for nonlinear partial differential equations. Included are complete treatments of the method of characteristics; energy methods within Sobolev spaces; regularity for second-order elliptic, parabolic, and hyperbolic equations; maximum principles; the multidimensional calculus of variations; viscosity solutions of Hamilton – Jacobi equations; shock waves and entropy criteria for conservation laws; and much more. The author summarises the relevant mathematics required to understand current research in PDEs, especially nonlinear PDEs. While he has reworked and simplified much of the classical theory (particularly the method of characteristics), he primarily emphasises the modern interplay between functional analytic insights and calculus type estimates within the context of Sobolev space. Treatment of all topics is complete and self-contained. The book's wide scope and clear exposition make it a suitable text for a graduate course in PDEs.

2009 ♦ 680 pp. ♦ Paperback
978-0-8218-4859-3 ♦ ₹ 900.00

Principles of Functional Analysis (Second Edition)

Schechter, Martin

Functional analysis plays a crucial role in the applied sciences as well as in mathematics. It is a beautiful subject that can be motivated and studied for its own sake. In keeping with this basic philosophy, the author has made this introductory text accessible to a wide spectrum of students, including beginning-level graduates and advanced undergraduates. The exposition is inviting, following threads of ideas, describing each as fully as possible, before moving on to a new topic. Supporting material is introduced as appropriate, and only to the degree needed. Some topics are treated more than once, according to the different contexts in which they arise. The prerequisites are minimal, requiring little more than advanced calculus and no measure theory. The text focusses on normed vector spaces and their important examples, Banach spaces and Hilbert spaces. The author also includes topics not usually found in texts on the subject. This Second Edition incorporates many new developments while not overshadowing the book's original flavour. Areas in the book that demonstrate its unique character have been strengthened. In particular, new material concerning Fredholm and semi-Fredholm operators is introduced, requiring minimal effort as the necessary machinery was already in place. Several new topics are presented, but relate to only those concepts and methods emanating from other parts of the book. These topics include perturbation classes, measures of noncompactness, strictly singular operators, and operator constants. Overall, the presentation has been refined, clarified, and simplified, and many new problems have been added.

2009 ♦ 425 pp. ♦ Paperback
978-0-8218-4856-2 ♦ ₹ 760.00

**Probability Theory in Finance:
A Mathematical Guide to the
Black-Scholes Formula**

Dineen, Seán

The use of the Black-Scholes model and formula is pervasive in financial markets. There are very few undergraduate textbooks available on the subject and, until now, almost none written by mathematicians. Based on a course given by the author, the goal of this book is to introduce advanced undergraduates and beginning graduate students studying the mathematics of finance to the Black-Scholes formula. The author uses a first-principles approach, developing only the minimum background necessary to justify mathematical concepts and placing mathematical developments in context. The book skillfully draws the reader toward the art of thinking mathematically and then proceeds to lay the foundations in analysis and probability theory underlying modern financial mathematics. It rigorously reveals the mathematical secrets of topics such as abstract measure theory, conditional expectations, martingales, Wiener processes, the Itô calculus, and other ingredients of the Black-Scholes formula. In explaining these topics, the author uses examples drawn from the universe of finance. The book also contains many exercises, some included to clarify simple points of exposition, others to introduce new ideas and techniques, and a few containing relatively deep mathematical results. With the modest prerequisite of a first course in calculus, the book is suitable for undergraduates and graduate students in mathematics, finance, and economics and can be read, using appropriate selections, at a number of levels.

Contents: Money and markets ❖ Fair games ❖ Set theory ❖ Measurable functions ❖ Probability spaces ❖ Expected values ❖ Continuity and integrability ❖ Conditional expectation ❖ Martingales ❖ The Black-Scholes formula ❖ Stochastic integration ❖ Solutions ❖ Bibliography ❖ Index

2011 ♦ 312 pp. ♦ Paperback
978-0-8218-6881-2 ♦ ₹ 755.00

Problems in Mathematical Analysis I: Real Numbers, Sequences and Series

Kaczor, W.J. & Nowak, M.T.

We learn by doing. We learn mathematics by doing problems. This book is the first volume of a series of books of problems in mathematical analysis. It is mainly intended for students studying the basic principles of analysis. However, given its organisation, level, and selection of problems, it would also be an ideal choice for tutorial or problem-solving seminars, particularly those geared toward the Putnam exam. The volume is also suitable for self-study. Each section of the book begins with relatively simple exercises, yet may also contain quite challenging problems. Very often several consecutive exercises are concerned with different aspects of one mathematical problem or theorem. This presentation of material is designed to help student comprehension and to encourage them to ask their own questions and to start research. The collection of problems in the book is also intended to help teachers who wish to incorporate the problems into lectures. Solutions for all the problems are provided.

2009 ♦ 380 pp. ♦ Paperback
978-0-8218-4854-8 ♦ ₹ 760.00

**Problems in Mathematical Analysis II:
Continuity and Differentiation**

Kaczor, W.J. & Nowak, M.T.

We learn by doing. We learn mathematics by doing problems. And we learn more mathematics by doing more problems. If you want to hone your understanding of continuous and differentiable functions, this book contains hundreds of problems to help you do so. The emphasis here is on real functions of a single variable. Topics include: continuous functions, the intermediate value property, uniform continuity, mean value theorems, Taylor's formula, convex functions, sequences and series of functions. The book is mainly geared toward students studying the basic principles of analysis. However, given its selection of problems, organisation, and level, it would be an ideal choice for tutorial or problem-solving seminars, particularly those geared toward the Putnam exam. It is also suitable for self-study. The presentation of the material is designed to help student comprehension, to encourage them to ask their own questions, and to start research. The collection of problems will also help teachers who wish to incorporate problems into their lectures. The problems are grouped into sections according to the methods of solution. Solutions for the problems are provided. Problems in *Mathematical Analysis I and III* are available as Volumes 4 and 21 in the AMS series Student Mathematical Library.

2009 ♦ 416 pp. ♦ Paperback
978-0-8218-4855-5 ♦ ₹ 760.00

**Problems in Mathematical Analysis III:
Integration**

Kaczor, W.J., Nowak, M.T.

The best way to penetrate the subtleties of the theory of integration is by solving problems. This book, like its two predecessors, is a wonderful source of interesting and challenging problems. As a resource, it is unequalled. It offers a much richer selection than is found in any current textbook. Moreover, the book includes a complete set of solutions. This is the third volume of *Problems in Mathematical Analysis*. The topic here is integration for real functions of one real variable. The first chapter is devoted to the Riemann and the Riemann – Stieltjes integrals. Chapter 2 deals with Lebesgue measure and integration. The authors include some famous, and some not so famous, inequalities related to Riemann integration. Many of the problems for Lebesgue integration concern convergence theorems and the interchange of limits and integrals. The book closes with a section on Fourier series, with a concentration on Fourier coefficients of functions from particular classes and on basic theorems for convergence of Fourier series. The book is mainly geared toward students studying the basic principles of analysis. However, given its selection of problems, organisation, and level, it would be an ideal choice for tutorial or problem-solving seminars, particularly those geared toward the Putnam exam. It is also suitable for self-study. The presentation of the material is designed to help student comprehension, to encourage them to ask their own questions, and to start research. The collection of problems will also help teachers who wish to incorporate problems into their lectures. The problems are grouped into sections according to the methods of solution. Solution for the problems are provided. *Problems in Mathematical Analysis I and II* are available as Volumes 4 and 12 in the AMS series Student Mathematical Library.

2009 ♦ 368 pp. ♦ Paperback
978-0-8218-4853-1 ♦ ₹ 720.00

MATHEMATICS

Real Analysis

Morgan, Frank

Real Analysis builds the theory behind the calculus directly from the basic concepts of real numbers, limits and open and closed sets of in \mathbb{R}^n . It gives the three characterizations of continuity: via epsilon-delta, sequences, and open sets. It gives three characterizations of compactness: as "closed and bounded," via sequences, and via open covers. Topics include Fourier series, the Gamma function, metric spaces, and Ascoli's Theorem.

The text not only provides efficient proofs, but also shows students how to come up with them. The excellent exercises come with select solutions in the back. Here is a real analysis text that is short enough for the student to read and understand and complete enough to be the primary text for a serious undergraduate course.

2010 ♦ 160 pp. ♦ Paperback
978-0-8218-5222-4 ♦ ₹ 550.00

Representation Theory and Automorphic Forms

Sally, Paul J. Jr. & Wallach, Nolan R. (Eds.)

The eleven papers collected in this volume provide a glimpse at the historical development of a subject which has expanded into many areas of mathematics during the past forty years. In addition, this volume provides easy access to a useful set of references. Chronicling some of the most important developments by some of the field's major figures, this book will appeal to specialists in representation theory as well as to researchers in those areas of mathematics in which representation theory plays an important role.

2010 ♦ 448 pp. ♦ Paperback
978-0-8218-5211-8 ♦ ₹ 950.00

Representations of Finite and Compact Groups

Simon, Barry

Barry Simon, I.B.M. Professor of Mathematics and Theoretical Physics at the California Institute of Technology, is the author of several books, including such classics as *Methods of Mathematical Physics* (with M. Reed) and *Functional Integration and Quantum Physics*. This new book, based on courses given at Princeton, Caltech, ETH-Zurich, and other universities, is an introductory textbook on representation theory. According to the author, "Two facets distinguish my approach. First, this book is relatively elementary, and second, while the bulk of the books on the subject is written from the point of view of an algebraist or a geometer, this book is written with an analytical flavor". The exposition in the book centres around the study of representation of certain concrete classes of groups, including permutation groups and compact semi-simple Lie groups. It culminates in the complete proof of the Weyl character formula for representations of compact Lie groups and the Frobenius formula for characters of permutation groups. Extremely well tailored, both for a one-year course in representation theory and for independent study, this book is an excellent introduction to the subject which, according to the author, is unique in having "so much innate beauty so close to the surface".

2009 ♦ 266 pp. ♦ Paperback
978-0-8218-4851-7 ♦ ₹ 640.00

Topics in Applied Abstract Algebra

Nagpaul, S.R. and Jain, S.K.

This book presents interesting applications of abstract algebra to practical real-world problems. The book is appropriate as either a text for an applied abstract algebra course or as a supplemental text for a standard course in abstract algebra. While fully developed, the algebraic theory presented is just what is required for the applications discussed in the book.

2010 ♦ 336 pp. ♦ Paperback
978-0-8218-5213-2 ♦ ₹ 775.00

NEW

Transformation Groups for Beginners

Duzhin, S V & Chebotarevsky, B D

The notion of symmetry is important in many disciplines, including physics, art, and music. The modern mathematical way of treating symmetry is through transformation groups. This book offers an easy introduction to these ideas for the relative novice, such as undergraduates in mathematics or even advanced undergraduates in physics and chemistry. The first two chapters provide a warm-up to the material with, for example, a discussion of algebraic operations on the points in the plane and rigid motions in the Euclidean plane. The notions of a transformation group and of an abstract group are then introduced. Group actions, orbits, and invariants are covered in the next chapter. The final chapter gives an elementary exposition of the basic ideas of Sophus Lie about symmetries of differential equations. Throughout the text, examples are drawn from many different areas of mathematics. Plenty of figures are included, and many exercises with hints and solutions will help readers master the material.

Contents: Introduction ♦ Algebra of points ♦ Plane movements ♦ Transformation groups ♦ Arbitrary groups ♦ Orbits and ornaments ♦ Other types of transformations ♦ Symmetries of differential equations ♦ Answers, hints and solutions to exercises ♦ Index

2011 ♦ 256 pp. ♦ Paperback
978-0-8218-6890-4 ♦ ₹ 640.00

Twenty-Four Hours of Local Cohomology

Iyengar, Srikanth B, et.al.,

This book is aimed to provide an introduction to local cohomology which takes cognizance of the breadth of its interactions with other areas of mathematics. It covers topics such as the number of defining equations of algebraic sets, connectedness properties of algebraic sets, connections to sheaf cohomology and to de Rham cohomology, Gröbner bases in the commutative setting as well as for SDS -modules, the Frobenius morphism and characteristic p methods, finiteness properties of local cohomology modules, semigroup rings and polyhedral geometry, and hypergeometric systems arising from semigroups. The book begins with basic notions in geometry, sheaf theory, and homological algebra leading to the definition and basic properties of local cohomology. Then it develops the theory in a number of different directions, and draws connections with topology, geometry, combinatorics, and algorithmic aspects of the subject.

Contents: Introduction ♦ Lecture 1: Basic Notions ♦ Lecture 2: Cohomology ♦ Lecture 3: Resolutions and Derived Functors ♦ Lecture 4: Limits ♦ Lecture 5: Gradings, Filtrations, and Gröbner Bases ♦ Lecture 6: Complexes from a Sequence of Ring Elements ♦ Lecture 7: Local Cohomology ♦ Lecture 8: Auslander-Buchsbaum Formula and Global Dimension ♦ Lecture 9: Depth and Cohomological Dimension ♦ Lecture 10: Cohen-Macaulay Rings ♦ Lecture 11: Gorenstein Rings ♦ Lecture 12: Connections with

MATHEMATICS

Sheaf Cohomology ❖ Lecture 13: Projective Varieties
❖ Lecture 14: The Hartshorne-Lichtenbaum Vanishing Theorem
❖ Lecture 15: Connectedness ❖ Lecture 16: Polyhedral Applications
❖ Lecture 17: D-modules ❖ Lecture 18: Local Duality Revisited
❖ Lecture 19: De Rham Cohomology ❖ Lecture 20: Local Cohomology over Semigroup Rings
❖ Lecture 21: The Frobenius Endomorphism ❖ Lecture 22: Curious Examples
❖ Lecture 23: Algorithmic Aspects of Local Cohomology
❖ Lecture 24: Holonomic Rank and Hypergeometric Systems
❖ Appendix: Injective Modules and Matlis Duality
❖ Bibliography ❖ Index

2011 ♦ 304 pp. ♦ Paperback
978-0-8218-6883-6 ♦ ₹ 755.00

LITTLE MATHEMATICAL TREASURES

This series, in association with the Ramanujan Mathematical Society, is addressed to mathematically mature readers and students in their last two years of school education. The books in this series will contain expository material not generally included in standard school or college texts.

Gateway to Modern Mathematics, A: Adventures in Iterations I

Shirali, Shailesh A.

Iterations are an exciting topic to study, for the amateur as well as the professional. Many of the iterations in elementary mathematics offer scope for extended investigation. They are like a gateway for learning important themes of modern mathematics, such as fractals and chaos; they offer a route for experiencing the experimental and visually aesthetic side of mathematics.

This book is at an elementary level, and is suitable for students aged 13–18 years. The idea of iteration is introduced together with various associated notions (fixed points, orbits, cycles, limit points, convergence, solution of equations, cobwebbing, and so on). A large number of examples are studied from the world of arithmetic, algebra and geometry.

2009 ♦ 236 pp. ♦ Paperback
978-81-7371-626-3 ♦ ₹ 395.00

Gateway to Modern Mathematics, A: Adventures in Iteration II

Shirali, Shailesh A.

This is the concluding part of the two-volume work on iterations.

The present work continues the study of iterations, started in *Iteration I*, but at a higher level. It examines the insights on iteration provided by differential calculus. Various approaches to the numerical solution of equations using iterations are studied. The book includes a brief account of two fascinating discoveries made in recent years—the theorems of Li and Yorke, and of Sarkovskii. Julia sets of fractional linear maps and quadratic maps, and some associated notions, including the famous Mandelbrot set are introduced.

2010 ♦ 260 pp. ♦ Paperback
978-81-7371-692-8 ♦ ₹ 375.00

MATHEMATICAL MARVELS
(A SERIES BY SHIRALI, SHAILESH A.)

Adventures in Problem Solving

This book deals with an important area in mathematics—Problem Solving—making it an exciting adventure. Having been associated with the Mathematical Olympiad programme since its inception in India, the author has drawn a lot on this experience in terms of material as well as in terms of the lucid style of writing. In this book, which is addressed to problem buffs, you will find many topics in ‘serious’ and ‘recreational’ mathematics developed through problems (surds, logarithms, geometry, inequalities, magic squares, cryptarithms, logic, counting, number theory, games such as Nim, . . .). It will be particularly useful to students who wish to appear for the Mathematical Olympiads.

2002 ♦ 328 pp. ♦ Paperback
978-81-7371-413-9 ♦ ₹ 350.00

First Steps in Number Theory: A Primer on Divisibility

This book deals with tests of divisibility and the rich theory behind them. Along the way, the reader will study a subject called Number Theory. To study this book, all that is required is familiarity with elementary arithmetic and algebra (addition and subtraction of algebraic expressions, the laws of exponents, the idea of prime factorization of an integer, the notion of relative primeness of two integers, etc.); in short, material which would normally be covered in grades 7–9 in most countries. Plenty of exercises are scattered throughout the book, with solutions at the end.

2000 ♦ 200 pp. ♦ Paperback
978-81-7371-368-2 ♦ ₹ 250.00

Primer on Logarithms, A

The book describes how logarithms are used in scales of measurement: for intensity of sound (decibel scale), intensity of earthquakes (Richter scale), level of acidity of a solvent (pH level), brightness of stars (absolute and apparent magnitude). The key properties of the log function are presented, those that make it so attractive and so indispensable in science—for describing population growth, radioactivity, cooling, etc. This book will be particularly useful to students who wish to appear for the Mathematical Olympiads. The presentation is enhanced with snippets and illustrated by line drawings.

2002 ♦ 200 pp. ♦ Paperback
978-81-7371-414-6 ♦ ₹ 275.00

Primer on Number Sequences, A

This book offers an excursion into the world of number sequences, objects that occur widely all through Mathematics. Part I deals with the generating formula of a sequence, and Part II with individual sequences such as the squares, the cubes, the primes, the unit fractions, the Fibonacci numbers, and so on. The book is aimed at students and general readers. It will be particularly useful to students who wish to appear for the Mathematical Olympiads.

2001 ♦ 172 pp. ♦ Paperback
978-81-7371-369-9 ♦ ₹ 320.00

MATHEMATICS

MATHEMATICAL WORLD
(A series in association with the
American Mathematical Society)

This exciting series brings the beauty and captivation of mathematics to the undergraduate, to the mathematics teacher, to the scientist or engineer, and to the lay reader with a strong interest in mathematics. It features well-written, challenging expository works that capture the fascination and usefulness of mathematics.

KVANT SELECTA: Algebra and Analysis

Tabachnikov, Serge (Ed.)

These two books are the first volumes of articles published from 1970 to 1990 in the Russian journal, *Kvant*. The influence of this magazine on mathematics and physics education in Russia is unmatched. Articles selected for these two volumes are written by leading Russian mathematicians and expositors. Some articles contain classical mathematical gems still used in university curriculae today. The articles in these books are written so as to present genuine mathematics in a conceptual, entertaining, and accessible way. The volumes are designed to be used by students and teachers who love mathematics and want to study its various aspects, thus deepening and expanding the school curriculum. The articles in the first volume are mainly devoted to various topics in number theory, and the second volume treats diverse aspects of analysis and algebra.

Volume 1

2002 ♦ 168 pp. ♦ Paperback
978-81-7371-417-7 ♦ ₹ 225.00

Volume 2

2002 ♦ 176 pp. ♦ Paperback
978-81-7371-418-4 ♦ ₹ 225.00

Mathematical Circles (Russian Experience)

Fomin, D., Genkin, S. & Itenberg, I.

This book was produced by a remarkable cultural circumstance in the former Soviet Union which fostered the creation of groups of students, teachers, and mathematicians called *Mathematical Circles*. The work is predicated on the idea that studying mathematics can generate the same enthusiasm as playing a team sport—without necessarily being competitive. This book is intended for both students and teachers who love mathematics and want to study its various branches beyond the limits of the school curriculum. It is also a book of mathematical recreation and, at the same time, a book containing vast theoretical and problem material in the main areas of what the authors consider to be 'extracurricular mathematics'.

1998 ♦ 288 pp. ♦ Paperback
978-81-7371-115-2 ♦ ₹ 295.00

Primer of Mathematical Writing, A

Krantz, S.G.

This book is about writing in the professional mathematical environment. There are few people equal to this task, yet Steven Krantz is one who qualifies. While the book is nominally about writing, it is also about how to function in the mathematical profession. Krantz has produced a quality work which makes evident the power and significance of writing in the mathematical profession.

1998 ♦ 240 pp. ♦ Paperback
978-81-7371-127-5 ♦ ₹ 275.00

Stories about Maxima and Minima

Tikhomirov, V.M.

This book aims to acquaint the reader with the whole circle of ideas and provide an understanding of how and why a mathematical theory is born. In Part I the reader will get to know many concrete problems and, in the course of the discussion of their solutions, will get to know the creative work of some of the best mathematicians of the past. In Part II the author introduces a method to solve maximum and minimum problems that originated with Lagrange and concludes by solving all the problems that are dealt with in Part I (problems marked by the dissimilarity of their solutions) by means of a single general method, in a standard way, by using one and the same solution.

1998 ♦ 200 pp. ♦ Paperback
978-81-7371-121-3 ♦ ₹ 250.00

Techniques of Problem Solving

Krantz, S.G.

The purpose of this book is to teach the basic principles of problem solving, including both mathematical and non-mathematical problems. Taking a direct and practical approach to the subject matter, Krantz's book stands apart from others like it in that it incorporates exercises throughout the text. Additional problems are included for readers to tackle at the end of each chapter. There are more than 350 problems in all. A Solutions Manual to most end-of-chapter exercises is available.

1998 ♦ 480 pp. ♦ Paperback
978-81-7371-116-9 ♦ ₹ 495.00

Solutions Manual for Techniques of Problem Solving

Fernández, L. & Gooransarab, H.

This manual contains solutions to most of the exercises in the book *Techniques of Problem Solving* by Steven G. Krantz. It is essential that this manual be used only as a reference, and never as a way to learn how to solve the exercises. It is strongly encouraged never to look up the solution of any exercise before attempting to solve it. The 'attempt time' will always be as rewarding to the student—or maybe more—as solving the exercise itself.

1998 ♦ 200 pp. ♦ Paperback
978-81-7371-117-6

RECREATIONAL MATHEMATICS

This series of books is for those interested in recreational mathematics. Whether a newcomer or an old-timer in the field, each reader will find in these books a brand new experience. The books in this series are collections of closely-related articles from a magazine, *The Journal of Recreational Mathematics*.

At Last !! Encoded Totals Second Addition

Kahan, S.

This long-awaited sequel to *Have Some Sums to Solve* deals with alphametics or cryptarithms interspersed with fascinating facts in number theory. The appeal of these puzzles can really be traced to the fact that achieving success is virtually independent of one's mathematical prowess.

1998 ♦ 140 pp. ♦ Paperback
978-81-7371-138-1 ♦ ₹ 175.00

MATHEMATICS

Have Some Sums to Solve

Kahan, S.

This fine publication, which enjoys a worldwide circulation, presents stimulating articles and problems dealing with all facets of the world of recreational mathematics.

1998 ♦ 128 pp. ♦ Paperback
978-81-7371-137-4 ♦ ₹ 135.00

Mathematical Solitaires and Games

Schwartz, B.L.

Solving games in combinatorial geometry requires an ability to imagine the various possibilities that are allowed. Mathematical toys made by modelling objects, shapes, colours, numbers and arrangements have been used for solitaire amusement or as part of competitive games.

1998 ♦ 160 pp. ♦ Paperback
978-81-7371-136-7 ♦ ₹ 150.00

Take a Look at a Good Book

Kahan, S.

This book is the third collection of additive alphametics for the connoisseur, the major difference being the prevalence of 'wider' ideal doubly-true alphametics, wherein the sums span nine or more columns.

1998 ♦ 140 pp. ♦ Paperback
978-81-7371-139-8 ♦ ₹ 125.00

MATHEMATICS

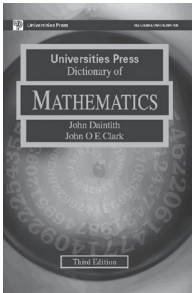
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ENCYCLOPAEDIA

DICTIONARIES

Universities Press Dictionary of Mathematics (Third Edition)

Daintith, J & Clark, J O E (Eds.)

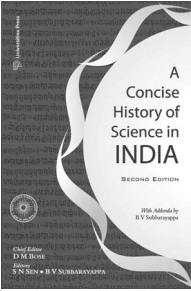


Extensively revised and expanded, the dictionary contains approximately 3,000 entries that explain, clearly and concisely, the most important and commonly used terms in every branch of mathematics. More than 200 new terms increase coverage of applied mathematics and computer science. An extensive appendix contains information about conversion factors and formulas. Almost 100 line drawings illustrate complex concepts, and extensive cross-references guarantee that no user will waste time searching for physical quantities, units of measure, conversion factors, formulas, important constants, and the Greek alphabets.

2000 ♦ 248 pp. ♦ Paperback
978-81-7371-300-2 ♦ ₹ 235.00

Concise History of Science in India, A (Second Edition)

Bose, D M, Sen, S N, Subbarayappa, B V (Ed.)



India's contributions in the field of science have been very influential in the development of human civilisation. The decimal place value system and the Ayurvedic way of life are just two well-known legacies of this ancient culture. Yet there are only a few books which provide an unbiased and authentic view of this world. One reason for this is that the study of Indian science through the ages involves the complex integration of the knowledge of many languages and diverse scientific disciplines. Through the years, there has been growing interest in this study as an important aspect in understanding man's interaction with nature, his material life and cultural patterns. The Indian National Science Academy, through its History of Science Board (1958) and the National Commission for the Compilation of History of Sciences in India (1967) renamed in 1989 as the Indian National Commission for History of Science sought further means to stimulate this interest among universities and scholars. The result was the publication of A Concise History of Science in India.

This book attempts to present a brief account of the development of science from early times to Independence, in one of the most ancient civilisations of the world. After

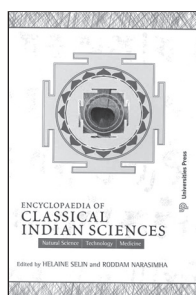
MATHEMATICS

nearly four decades since its publication, *A Concise History of Science in India* remains one of the most extensive and authentic account of Indian science through the ages. Yet further studies in the field have brought to light new material. This revised edition, taken up by B V Subbarayappa, one of the three original editors, seeks to integrate the new information with the knowledge already at hand.

2009 ♦ 980 pp. ♦ Paperback
978-81-7371-619-5 ♦ ₹ 995.00

Encyclopaedia of Classical Indian Sciences

Selin, Helaine & Narasimha, Roddam



India's contributions to science and technology are among the most ancient and influential in the world. In mathematics, the decimal place value system with zero as a numeral, used universally today, owes its origin to India. The science of Ayurveda, which has been practised for millennia in India, is now gaining wider acceptance even as many ancient remedies are turned into modern drugs. Indian astronomical computations, ritual geometry, brick technology and metallurgical innovations have been among the finest achievements in the world of science and technology.

Encyclopaedia of Classical Indian Sciences is an attempt to provide an authentic account of natural science, technology and medicine as practised by Indians and other South Asians. It also includes biographical articles on many

ancient Indian scientists, and some articles (polemic in nature) on the history of Indian science and technology, such as the essay on the effects of colonialism. All articles are contributions of acknowledged authorities on their subject drawn from across the world.

2007 ♦ 492 pp. ♦ Hardback
978-81-7371-555-6 ♦ ₹ 1025.00

══════ FORTHCOMING ══════

Paths of Innovators (Volumes I and II)

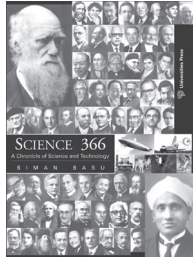
Parthasarathy, R

This book contains a collection of scientists' lives, their struggles, their achievements and their laurels. They have been grouped under five disciplines Engineering, Physics, Mathematics, Chemistry and Life Sciences. The aim of these brief biographical sketches is to inspire a wider audience to take up the noble pursuit of pure sciences.

In science, a spectacular achievement is remembered but the foundation on which the achievement was based is often forgotten; Dr. Parthasarathy reminds us of this basic fact. The scientists selected by the author span several centuries and almost all the persons who laid the foundation of modern science and built its edifice are there. This is a storehouse of information, there is almost nothing in it, which is not interesting—R. Chidambaram (Principal Scientific Advisor to the Government of India and DAE—Homi Bhabha Professor).

Science 366: A Chronicle of Science and Technology

Basu, Biman



Dates have an important place in our lives—not only are they historical occasions that we observe every year but they are also milestones to measure our growth in age, prosperity and wisdom. Therefore, dates in the scientific field can be used as a measure of progress in our quest for the unknown—dates when some important scientific discovery was made or some famous scientist was born. There are also dates that mark important breakthroughs in our understanding of the universe around us—new discoveries and new inventions that have changed our life.

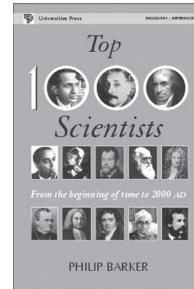
This book can be considered a diary of scientific events—both Indian and international—including dates related to scientists and their works; inventors and their inventions; scientific organisations; and important scientific occurrences.

The entries are arranged chronologically. An entry for the date of birth of a scientist or inventor gives a brief biography of the person, while an entry for the date of founding or inauguration of a scientific institution gives a brief summary of the activities and achievements of the institution. All the entries are cross-referenced for easy navigation.

2008 ♦ 712 pp. ♦ Paperback
978-81-7371-607-2 ♦ ₹ 950.00

Top 1000 Scientists: From the Beginning of Time to 2000 AD

Barker, Philip



The history of scientific progress is full of surprises. How many people realise, for example, that the term 'electricity' was coined in 1646?, or that Benjamin Franklin invented the lightning conductor?, that even a seemingly recent invention such as the television turns out to have been patented in 1884.

This book covers science and scientists from the earliest recorded days right up to the new millennium, and will become an invaluable reference work as well as a delight to dip into.

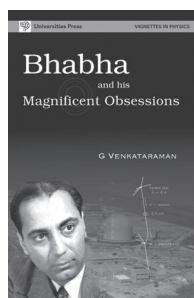
2002 ♦ 448 pp. ♦ Paperback
978-81-7371-210-4 ♦ ₹ 595.00

MATHEMATICS

BIOGRAPHIES

Bhabha and His Magnificent Obsessions

Venkataraman, G.

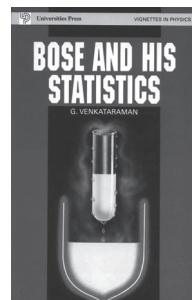


This book is about the remarkable scientist Homi Jehangir Bhabha who, at the age of eighteen, went to Cambridge to study physics and started his research career there. In 1939, when Bhabha came to India on a short vacation, he was forced to stay on as the Second World War broke out. This was, of course, a blessing for the country as he later steered the country's scientific destiny. The book records Bhabha's contributions which were in many dimensions and not just purely scientific.

1994 ♦ 222 pp. ♦ Paperback
978-81-7371-007-0 ♦ ₹ 250.00

Bose and His Statistics

Venkataraman, G.

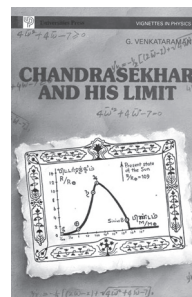


This book describes a monumental discovery made by Satyendranath Bose. It also helps the reader take a step closer in understanding Bose—the scientist—and describes the events that surround this exciting discovery.

1992 ♦ 136 pp. ♦ Paperback
978-81-7371-036-0 ♦ ₹ 195.00

Chandrasekhar and His Limit

Venkataraman, G.



This is a heartwarming and very inspiring story about Subrahmanyam Chandrasekhar, the most distinguished mathematical physicist India has produced. In a long and remarkable career, Chandrasekhar has done many outstanding things but this book concentrates mostly on one of them, namely, the discovery of the Chandrasekhar Limit.

1992 ♦ 144 pp. ♦ Paperback
978-81-7371-035-3 ♦ ₹ 195.00

==== FORTHCOMING ====

Kariamanikkam Srinivasa Krishnan: His Life and Work

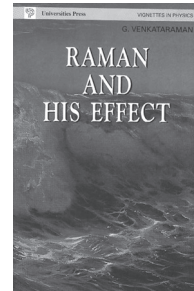
Mallik, D. C. V., Chatterjee, S.

The first four decades of the 20th century were glorious years for science, especially physics. Our view of the physical world changed forever with the emergence of quantum mechanics and Einstein's formulation of the theory of relativity. India too contributed significantly to this scientific revolution with the discoveries made by S N Bose, C V Raman and M N Saha, all in the space of about a decade. Kariamanikkam Srinivasa Krishnan (1898- 1961) belonged to the same illustrious group. He was perhaps the only Indian physicist of his generation who was equally adept in theory and experiment. Besides a life of excellence in science, Krishnan's destiny led him to become an able science policy maker and administrator; innately he was a great teacher, a humanist and a scholar of Sanskrit, Tamil literature and philosophy.

This biography, besides being a detailed and meticulously documented account of Krishnan's life and his scientific work, is also an exciting account of the history of Indian science of the period. The source material of this work, most of which are being used for the first time, comes from the private papers of K S Krishnan that had remained in the custody of his family.

Raman and His Effect

Venkataraman, G.

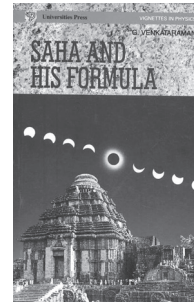


This book deals with the famous Scattering Effect discovered by Sir C. V. Raman. It gives us deep insights into the character of this famous scientist and vividly describes the circumstances surrounding the discovery.

1995 ♦ 108 pp. ♦ Paperback
978-81-7371-008-7 ♦ ₹ 195.00

Saha and His Formula

Venkataraman, G.



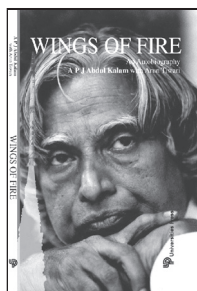
A great leap forward in unravelling the mysteries of the Sun occurred way back in 1920 when Meghnad Saha made an important discovery that paved the way for a systematic study of stellar atmospheres in general. This book is about that great discovery and the man who made it.

1995 ♦ 206 pp. ♦ Paperback
978-81-7371-017-9 ♦ ₹ 195.00

MATHEMATICS

Wings of Fire: An Autobiography

Kalam, A P J Abdul with Arun Tiwari



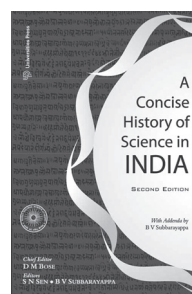
Avul Pakir Jainulabdeen Abdul Kalam, the son of a little-educated boat-owner in Rameswaram, Tamil Nadu, had an unparalleled career as a defence scientist, culminating in the highest civilian award of India, the Bharat Ratna. As chief of the country's defence research and development programme, Kalam demonstrated the great potential for dynamism and innovation that existed in seemingly moribund research establishments. This is the story of Kalam's rise from obscurity and his personal and professional struggles, as well as the story of Agni, Prithvi, Akash, Trishul and Nag—missiles that have become household names in India and have raised the nation to the level of a missile power of international reckoning. This is also the saga of independent India's struggle for technological self-sufficiency and defensive autonomy—a story as much about politics (domestic and international) as it is about science.

1999 ♦ 212 pp. ♦ Paperback
978-81-7371-146-6 ♦ ₹ 250.00

HISTORY OF SCIENCE

Concise History of Science in India, A (Second Edition)

Bose, D M, Sen, S N, Subbarayappa, B V (Ed.)



India's contributions in the field of science have been very influential in the development of human civilisation. The decimal place value system and the Ayurvedic way of life are just two well-known legacies of this ancient culture. Yet there are only a few books which provide an unbiased and authentic view of this world. One reason for this is that the study of Indian science through the ages involves the complex integration of the knowledge of many languages and diverse scientific disciplines. Through the years, there has been growing interest in this study as an important aspect in understanding man's interaction with nature, his material life and cultural patterns. The Indian National Science Academy, through its History of Science Board (1958) and the National Commission for the Compilation of History of Sciences in India (1967) renamed in 1989 as the Indian National Commission for History of Science sought further means to stimulate this interest among universities and scholars. The result was the publication of *A Concise History of Science in India*.

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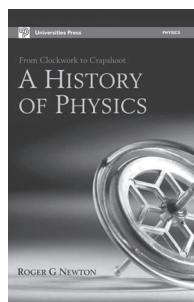
MATHEMATICS

nearly four decades since its publication, *A Concise History of Science in India* remains one of the most extensive and authentic account of Indian science through the ages. Yet further studies in the field have brought to light new material. This revised edition, taken up by B V Subbarayappa, one of the three original editors, seeks to integrate the new information with the knowledge already at hand.

2009 ♦ 980 pp. ♦ Paperback
978-81-7371-619-5 ♦ ₹ 995.00

From Clockwork to Crapshot: A History of Physics

Newton, Roger G.



The book provides the perspective needed to understand contemporary developments in physics in relation to philosophical traditions as far back as ancient Greece.

Roger G Newton presents a history of physics from the early beginning to our day—with the associated mathematics, astronomy, and chemistry. Along the way, he gives brief explanations of the scientific concepts at issue, biographical thumbnail sketches of the protagonists, and descriptions of the new instruments that enabled scientists to make their discoveries. He traces a profound transformation from a deterministic explanation of the world—accepted at least since the time of the ancient Greek and Taoist Chinese civilizations—to the notion of probability,

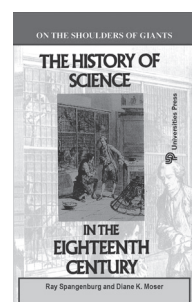
www.universitiespress.com

enshrined as the very basis of science with the quantum evolution at the beginning of the twentieth century. This brought about a fundamental shift in the focus of physicists—from dynamics or motion to the underlying architecture of the universe. Their new goal—to explain being rather than change—may well be the defining characteristic of physics in the twenty-first century.

2008 ♦ 352 pp. ♦ Paperback
978-81-7371-625-6 ♦ ₹ 395.00

History of Science in the Eighteenth Century, The

Spangenburg, R. & Moser, D. K.



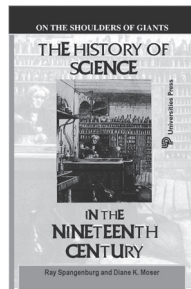
This book covers the Enlightenment and the beginnings of the Industrial Revolution. It recounts the findings of leading scientists of the day on such subjects as electricity, gases, and the classification of living things. Included also is a discussion of the scientific theories that shaped and inspired the discoveries of this vital era. Illustrated with line art and photographs, this book presents the amazing breadth of 18th-century scientific thought, which laid the foundations for the way we perceive the world today.

1994 ♦ 176 pp. ♦ Paperback
978-81-7371-193-0 ♦ ₹ 250.00

MATHEMATICS

History of Science in the Nineteenth Century, The

Spangenburg, R. & Moser, D. K.



This book outlines the greatest achievements of the century that brought to a close the era of classical science and set the stage for the development of science as we know it today. This period saw exciting discoveries about electricity and magnetism; genetics and evolution; the age of the earth; the stars and planets; and the nature of infection and disease—discoveries that revolutionised the way people lived and perceived the world around them. Enhanced with numerous photographs and illustrations, this volume is a fascinating introduction to the breadth and vitality of nineteenth century scientific thought.

1994 ♦ 160 pp. ♦ Paperback
978-81-7371-195-4 ♦ ₹ 250.00

History of Science from 1946 to the 1990s, The

Spangenburg, R. & Moser, D. K.



This, the final book in the series, discusses the most significant scientific breakthroughs since World War II. The book addresses the move toward increased specialisation in all branches of science and the greater use of computers in scientific research. From the study of subatomic particles to missions into outer space, it reveals the rapidly expanding horizons of science. Lavishly illustrated, this book also explores a change in attitude toward science—while science enabled enormous advances in the 20th century, it is sometimes blamed for dangers such as the threats from nuclear war, waste, and power plant accidents, and the deterioration of the ozone layer.

1994 ♦ 192 pp. ♦ Paperback
978-81-7371-196-1 ♦ ₹ 250.00

==== FORTHCOMING ====

Kariamanikkam Srinivasa Krishnan: His Life and Work

Mallik, D. C. V., Chatterjee, S.

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Shaping of Indian Science, The

ISCA-Indian Science Congress Association Presidential Addresses



These are a compendium of the speeches of the Presidents of the Indian Science Congress Association (ISCA) from 1914–2003. Through the years, these Presidents have inspired the Congress by their speeches—some of them visionary, some impassioned in their plea for Science, but all of them with a message that Science must be used for the good of the human race. The Presidents have been eminent personalities in the world of Science and have left their mark on the course of Science in India. This series was inspired by the belief that these luminaries deserved greater coverage in a reference source devoted exclusively to providing their messages and brief biographical sketches, in the hope that they will inspire a wider audience to take up the noble pursuit of Science.

- Volume 1
2003 ♦ 592 pp. ♦ Hardback
978-81-7371-432-0 ♦ Print on demand
.....
- Volume 2
2003 ♦ 704 pp. ♦ Hardback
978-81-7371-433-7 ♦ Print on demand
.....
- Volume 3
2003 ♦ 788 pp. ♦ Hardback
978-81-7371-434-4 ♦ Print on demand
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Volume 4:

2010 ♦ 111 pp. ♦ Paperback
978-81-7371-708-6 ♦ Print on demand

INDEX

- 1001 Problems in Classical Number Theory 24
103 Trigonometry Problems 1
104 Number Theory Problems: From the Training
of the USA IMO Team 1
- Abhyankar, Shreeram S* 26
Abraham, Ralph & Marsden, Jerrold E 31
Abstract Algebra 24
Across the Board: The Mathematics of
Chessboard Problems 1
Actuarial Statistics: An Introduction Using R 1
Adam, John A. 15
Advanced Calculus (Second Edition) 25
Advances in Computational Optimization and its
Applications 2
Adventures in Problem Solving 45
Aigner, Martin & Ziegler, Günter M. 19
Alevras, Dimitris & Padberg, Manfred W. 11
Algebra: A Graduate Course 25
Algebraic and Geometric Theory of Quadratic
Forms, The 25
Algebraic Curves and Riemann Surfaces 26
Algebraic Geometry for Scientists and Engineers
26
Algebraic Geometry: A First Course 2
Algebraic Number Fields (Second Edition) 27
Altaisky, M.V. 23
Analytical Solid Geometry 2
Andreescu, Titu & Enescu, Bogdan 14
Andreescu, Titu & Feng, Zuming 1
Andreescu, Titu & Gelca, Razvan 14
Apostol, Tom M. 10
Applied Linear Algebra: The Decoupling
Principle (Second Edition) 27
At Last !! Encoded Totals Second Addition 47
Athreya, S.R. & Sunder, V.S. 15
Axler, Sheldon 11
Bagchi S C et al. 8
- Balachandra Rao, S. & Anuradha, H.R.* 5
Balachandra Rao, S. & Shantha, C.K. 17
Barker, Philip 51
Bartle, Robert G. 37, 38
Basu, Biman 51
*Beck, Anatole, Bleicher, Michael N. & Crowe,
Donald W.* 7
Bertsekas, Dimitri P. 4
Bhabha and His Magnificent Obsessions 52
Blatter, Christian 22
Boehm, W. & Prautzsch, H. 17
Boju, Valentin & Funar, Louis 12
Bose and His Statistics 52
Bose, D M, Sen, S N, Subbarayappa, B V (Ed.) 49, 54
Bressoud, David M. 19
Browder, Andrew 13
Brown, Arlen & Percy, Carl 9
- Cake-Cutting Algorithms: Be Fair If You Can 3
Calculus of Finance, The 3
Chandrasekhar and His Limit 52
Chow, Bennett et al. 34
Code Breaking: A History and Exploration 3
Cohen, Joel S. 4
Companion to Analysis, A: A Second First and
First Second Course in Analysis 28
Computer Algebra and Symbolic Computation:
Elementary Algorithms 4
Computer Algebra and Symbolic Computation:
Mathematical Methods (with CD-ROM) 4
Computer Arithmetic Algorithms (Second
Edition) 4
Concepts in Abstract Algebra 28
Concise History of Science in India, A (Second
Edition) 49, 54
Convex Optimization Theory 4
Course in Algebra, A 28
Cryptography: An Introduction 29

Prices are subject to change without notice

INDEX

- Curves and Surfaces (Second Edition) 29
- Daintith, J & Clark, J O E (Eds.)* 22, 49
- Dass, Tulsi & Sharma, S. K.* 13
- Deb, Kalyanmoy, et al.* 2
- Delampady, M., Krishnan, T. & Ramasubramanian, S. (Eds.)* 18
- Deo, Sadashiv G. et al.* 18
- Deshmukh, Shailaja R.* 1
- Differential Equations with Applications and Programs 5
- Differential Geometry, Lie Groups, and Symmetric Spaces 30
- Dineen, Seán* 40
- Discrete Mathematical Structures with Applications to Combinatorics 5
- Djukic, D. et al.* 9
- Doob, J.L* 16
- Dorin, Andreescu, Andrica, Titu & Feng, Zuming* 1
- Dubrovin B. A., Fomenko A.T., Novikov S. P.* 16
- Duzhin, S V & Chebotarevsky, B. D.* 43
- é: The Story of a Number 5
- Educative JEE: Mathematics (Second Edition) 5
- Eidelman, Yuli, Milman, Vitali & Tsolomitis, Antonis* 32
- Elementary Number Theory : A Collection of Problems with Solutions 6
- Elman, Richard, Karpenko, Nikita & Merkurjev, Alexander* 25
- Encyclopaedia of Classical Indian Sciences 50
- Engineering Mathematics 6
- Engineering Optimization: A Modern Approach 6
- Evans, Lawrence C.* 39
- Excursions into Mathematics: The Millennium Edition 7
- Explorations in Mathematics 7
- Falk, Ruma* 22
- Fernández, L. & Gooransarab, H.* 47
- Field and Galois Theory 7
- Finite Group Theory 30
- First Course in Real Analysis, A 7
- First Course in Topology, A: Continuity and Dimension 31
- First Course on Representation Theory and Linear Lie Groups 8
- First Steps in Number Theory: A Primer on Divisibility 45
- Fitzpatrick, Patrick M.* 25
- Folland, Gerald B.* 31
- Fomin, D., Genkin, S. & Itenberg, I.* 46
- Foundations of Mechanics (Second Edition) 31
- Fourier Analysis and Its Applications 31
- From Clockwork to Crapshot: A History of Physics 55
- Fuchs, Dmitry & Tabachnikov, Serge* 36
- Fun and Fundamentals of Mathematics 8
- Function Theory of One Complex Variable (Third Edition) 32
- Functional Analysis: An Introduction 32
- Gamma: Exploring Euler's Constant 8
- Garrett, Birkhoff & Mac Lane, Saunders* 20
- Gateway to Modern Mathematics, A: Adventures in Iterations I 44
- Gateway to Modern Mathematics, A: Adventures in Iteration II 44
- Gaughan, Edward D.* 35
- Gelbaum, Bernard R.* 19
- Gelbaum, Bernard R. & Olmsted, John M.H.* 20
- Geometric Analysis on Symmetric Spaces 33
- Geometry of Differential Forms 33
- Global Calculus 34
- Graduate Algebra: Commutative View 34
- Graph Theory 8
- Greene, Robert E & Krantz, Steven G* 32
- Greub, Werner H.* 11
- Grinstead, Charles M. & Snell, J. Laurie* 35
- Group Theory: Selected Problems 9
- Habib, Amber* 3
- Hamilton's Ricci Flow 34

INDEX

- Harris, Joe* 2
Hattangadi, A.A. 7
Have Some Sums to Solve 48
Havil, Julian 8
Helgason, Sigurdur 30, 33
Hilton, Peter, Holton, Derek & Pedersen, Jean 15
History of Science from 1946 to the 1990s, The 56
History of Science in the Eighteenth Century, The 55
History of Science in the Nineteenth Century, The 56
How to Enjoy Calculus 9
Humphreys, J.E. 10
Illner, Reinhard et.al. 36
Imaginary Tale, An: The Story of $\sqrt{-1}$ 9
IMO Compendium, The: A Collection of Problems Suggested for The International Mathematical Olympiads: 1959–2004 9
Introduction to Analysis (Fifth Edition) 35
Introduction to Analysis, An 9
Introduction to Analytic Number Theory 10
Introduction to Lie Algebras and Representation Theory 10
Introduction to Mathematical Computer Science, An 10
Introduction to Probability (Second Edition) 35
Introduction to the Mathematics of Finance 35
Introductory Course in Elementary Number Theory, An 11
Isaacs, Martin 25, 30
ISCA-Indian Science Congress Association Presidential Addresses 57
Iyengar, Srikanth B, et.al., 43
Janusz, Gerald J. 27
Joglekar, S. D. 14
Joshi, K.D. 5
Kaczor, W.J. & Nowak, M.T. 40, 41
Kahan, S. 47, 48
Kalam, A P J Abdul with Arun Tiwari 54
Kariamanikkam Srinivasa Krishnan: His Life and Work 53, 57
Katok, Svetlana 38
Kincaid, David & Cheney, Ward 38
Kippenhahn, R. 3
Knoebel, A. et al. 13
Koninck, Jean-Marie De & Mercier, Armel 24
Koren, Israel 4
Körner, T W 28
Krantz, S.G. 46, 47
Krishnan 6
Kumar Murty, V. & Waldschmidt, Michel 38
Kumar, Rajnish 20
Kumaresan, S. 20
KVANT SELECTA: Algebra and Analysis 46
Lang, Serge 21
Lanski, Charles 28
Linear Algebra 11
Linear Algebra Done Right (Second Edition) 11
Linear Optimization and Extensions: Problems and Solutions 11
Lozansky, Edward & Rousseau, Cecil 23
Mallik, D. C. V., Chatterjee, S. 53, 57
Maor, E. 5, 21
Math Charmers: Tantalizing Tidbits for the Mind 12
Math Explorer, The: A Journey through the Beauty of Mathematics 12
Math Problems Notebook, The 12
Mathematical Analysis 12
Mathematical Analysis: An Introduction 13
Mathematical Century, The: The 30 Greatest Problems of the Last 100 Years 13
Mathematical Circles (Russian Experience) 46
Mathematical Masterpieces: Further Chronicles by the Explorers 13
Mathematical Methods in Classical and Quantum Physics 13

INDEX

- Mathematical Modelling: A Case Studies Approach 36
- Mathematical Olympiad Challenges 14
- Mathematical Olympiad Treasures 14
- Mathematical Omnibus: Thirty Lectures on Classic Mathematics 36
- Mathematical Physics: Advanced Topics 14
- Mathematical Physics: The Basics 14
- Mathematical Solitaires and Games 48
- Mathematical Vistas: From a Room with Many Windows 15
- Mathematics for Empowerment: Arithmetic and Algebra, Part 1 15
- Mathematics in Nature 15
- Matrix Groups for Undergraduates 37
McCleary, John 31
- Measure and Probability 15
- Measure Theory 16
Metz, James 21
Miranda, Rick 26
- Modern Geometry – Methods and Applications:
Part I: The Geometry of Surfaces,
Transformation Groups, and Fields (Second
Edition) 16
- Modern Geometry – Methods and Applications:
Part II. The Geometry and Topology of
Manifolds 16
- Modern Geometry – Methods and Applications:
Part III. Introduction to Homology Theory 16
- Modern Theory of Integration, A 37
Montiel, Sebastián & Ros, Antonio 29
Morandi, Patrick 7
Morgan, Frank 42
Morita, Shigeyuki 33
*Mukhopadhyay, P., Ghosh, Shamik, A.M. & Sen,
Mridul Kanti* 21
- Nagpaul, S.R. and Jain, S.K.* 43
- Nahin, Paul J.* 9, 23
- Narlikar, M. & Narlikar, J.* 8
- Newton, Roger G.* 55
- Number Theory 17, 38
- Numerical Analysis: Mathematics of Scientific
Computing (Third Edition) 38
- Numerical Methods 17
- Numerical Methods with Programs in BASIC,
FORTRAN, Pascal and C++ (Revised Edition)
17
- Odifreddi, Piergiorgio* 13
- p-adic Analysis Compared with Real 38
Parthasarathy, R 50
- Partial Differential Equations 17, 39
- Paths of Innovators (Volumes I and II) 50
- Pi: A Biography of the World's Most Mysterious
Number 18
Pine, E.S. 9
Pirzada, S. & Chishti, T.A. 2
- Popular Lectures in Undergraduate Mathematics
18
Posamentier, Alfred S. & Lehmann, Ingmar 18
- Primer of Mathematical Writing, A 46
- Primer on Logarithms, A 45
- Primer on Number Sequences, A 45
- Principles of Functional Analysis (Second
Edition) 39
- Probability and Statistics 18
- Probability and Statistics for Engineers and
Scientists 18
- Probability Theory in Finance: A Mathematical
Guide to the Black-Scholes Formula 40
- Problems in Mathematical Analysis I: Real
Numbers, Sequences and Series 40
- Problems in Mathematical Analysis II: Continuity
and Differentiation 41
- Problems in Mathematical Analysis III:
Integration 41
- Problems in Real and Complex Analysis 19
- Proofs from THE BOOK (Fourth Edition) 19
- Raman and His Effect 53
Ramanan, S. 34
Ramaswamy, V. 5
Ranjan Ganguli 6

INDEX

- Rao, Shankar, G* 18
Rauch, Jeffrey 17
Real Analysis 42
Representation Theory and Automorphic Forms 42
Representations of Finite and Compact Groups 42
Robertson, Jack & Webb, William 3
Rowen, Louis Halle 34
S Pirzada and A Dharwadker 8
Sadun, Lorenzo 27
Saha and His Formula 53
Sally, Paul J. Jr. & Wallach, Nolan R. (Eds.) 42
Sarveswara Rao, Koneru 6
Schechter, Martin 39
Schwartz, B.L. 48
Science 366: A Chronicle of Science and Technology 51
Second Year Calculus: From Celestial Mechanics to Special Relativity 19
Selin, Helaine & Narasimha, Roddam 50
Shaping of Indian Science, The 57
Shirali, Shailesh A. 15, 44
Shirali, Shailesh A. & Yogananda, C.S. 17
Short Courses in Mathematics 20
Short Stories About Numbers 20
Simon, Barry 42
Sinha, K.B., et al. 22
Sitaram, A. & Pati, V. 12
Solomon, Ronald 24
Solutions Manual for Techniques of Problem Solving 47
Solutions Manual to A Modern Theory of Integration 38
Spangenburg, R. & Moser, D. K. 55, 56
Stories about Maxima and Minima 47
Survey of Modern Algebra, A (Fifth Edition) 20
Sury, B. 9
Suryanarayan, E.R. 7
Tabachnikov, Serge (Ed.) 46
Take a Look at a Good Book 48
Tapp, Kristophe 37
Techniques of Problem Solving 47
Theorems and Counterexamples in Mathematics 20
Tikhomirov, V.M. 47
Top 1000 Scientists: From the Beginning of Time to 2000 AD 51
Topics in Abstract Algebra (Second Edition) 21
Topics in Applied Abstract Algebra 43
Transformation Groups for Beginners 43
Trigonometric Delights 21
Twenty-Four Hours of Local Cohomology 43
Ubiquitous Harmonic Relation, The 21
Undergraduate Analysis 21
Understanding Mathematics 22
Understanding Probability and Statistics: A Book of Problems 22
Universities Press Dictionary of Mathematics (Third Edition) 22, 49
Venkataraman, G. 52, 53
Vinberg, E. B. 28
Viswanath, Kasturi 10
Watkins, John J. 1
Wavelets: A Primer 22
Wavelets: Theory, Applications, Implementation 23
Weaver, Jefferson Hane 12
When Least is Best: How Mathematicians Discovered Many Clever Ways to Make Things as Small (or as Large) as Possible 23
Williams, R J 35
Wings of Fire: An Autobiography 54
Winning Solutions 23
Wissam Raji 11
Yaschenko V.V. 29



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