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*Introduction to Analysis*

This acclaimed book aids the transition from lower-division calculus to upper-division courses in linear and abstract algebra, real and complex analysis, number theory, topology and more, with examples, images, exercises and a solution manual for instructors.

*Logic, Sets, and Numbers*

Keith Devlin. You know him. You've read his columns in MAA Online, you've heard him on the radio, and you've seen his popular mathematics books. In between all those activities and his own research, he's been hard at work revising Sets, Functions and Logic, his standard-setting text that has smoothed the road to pure mathematics for legions of undergraduate students. Now in its third edition, Devlin has fully reworked the book to reflect a new generation. The narrative is more lively and less textbook-like. Remarks and asides link the topics presented to the real world of students' experience. The chapter on complex numbers and the discussion of formal symbolic logic are gone in favor of more exercises, and a new introductory chapter on the nature of mathematics—one that motivates readers and sets the stage for the challenges that lie ahead. Students crossing the bridge from calculus to higher mathematics need and deserve all the help they can get.

Sets, Functions, and Logic, Third Edition is an affordable little book that all of your transition-course students not only can afford, but will actually read and enjoy and learn from. About the Author Dr. Keith Devlin is Executive Director of Stanford University's Center for the Study of Language and Information and a Consulting Professor of Mathematics at Stanford. He has written 23 books, one interactive book on CD-ROM, and over 70 published research articles. He is a Fellow of the American Association for the Advancement of Science, a World Economic Forum Fellow, and a former member of the Mathematical Sciences Education Board of the National Academy of Sciences. Dr. Devlin is also one of the world's leading popularizers of mathematics. Known as "The Math Guy" on NPR's Weekend Edition, he is a frequent contributor to other local and national radio and TV shows in the US and Britain, writes a monthly column for the Web journal MAA Online, and regularly writes on mathematics and computers for the British newspaper The Guardian.

*Bridge to Abstract Mathematics*

Abstract Algebra: A Gentle Introduction advantages a trend in mathematics textbook publishing towards smaller, less expensive and brief introductions to primary courses. The authors move away from the ‘everything for everyone’ approach so common in textbooks. Instead, they provide the reader with coverage of numerous algebraic topics to cover the most important areas of abstract algebra. Through a careful selection of topics, supported by interesting applications, the authors intend the book to be used for a one-semester course in abstract algebra. It is suitable for an introductory course in for mathematics majors. The text is also very suitable for education majors who need to have an introduction to the topic. As textbooks go through various editions and authors employ the suggestions of numerous well-intentioned reviewers, these book become larger and larger and subsequently more expensive. This book is meant to counter that process. Here students are given a "gentle introduction," meant to provide enough for a course, yet also enough to encourage them toward future study of the topic. Features Groups before rings approach Interesting modern applications Appendix includes mathematical induction, the well-ordering principle, sets, functions, permutations, matrices, and complex nubers. Numerous exercises at the end of each section Chapter "Hint and Partial Solutions" offers built in solutions manual

*Proofs and Fundamentals*
A Bridge to Abstract Mathematics will prepare the mathematical novice to explore the universe of abstract mathematics. Mathematics is a science that concerns theorems that must be proved within the constraints of a logical system of axioms and definitions rather than theories that must be tested, revised, and retested. Readers will learn how to read mathematics beyond popular computational calculus courses. Moreover, readers will learn how to construct their own proofs. The book is intended as the primary text for an introductory course in proving theorems, as well as for self-study or as a reference. Throughout the text, some pieces (usually proofs) are left as exercises. Part V gives hints to help students find good approaches to the exercises. Part I introduces the language of mathematics and the methods of proof. The mathematical content of Parts II through IV were chosen so as not to seriously overlap the standard mathematics major. In Part II, students study sets, functions, equivalence and order relations, and cardinality. Part III concerns algebra. The goal is to prove that the real numbers form the unique, up to isomorphism, ordered field with the least upper bound. In the process, we construct the real numbers starting with the natural numbers. Students will be prepared for an abstract linear algebra or modern algebra course. Part IV studies analysis. Continuity and differentiation are considered in the context of time scales (nonempty, closed subsets of the real numbers). Students will be prepared for advanced calculus and general topology courses. There is a lot of room for instructors to skip and choose topics from among those that are presented.

**Introduction to Proof in Abstract Mathematics**

Student Solutions Manual for A Transition to Abstract Mathematics

**Introduction to Abstract Mathematics**

This is an introductory textbook designed for undergraduate mathematics majors with an emphasis on abstraction and in particular, the concept of proofs in the setting of linear algebra. Typically such a student would have taken calculus, though the only prerequisite is suitable mathematical grounding. The purpose of this book is to bridge the gap between the more conceptual and computational oriented undergraduate classes to the more abstract oriented classes. The book begins with systems of linear equations and complex numbers, then relates these to the abstract notion of linear maps on finite-dimensional vector spaces, and covers diagonalization, eigenspaces, determinants, and the Spectral Theorem. Each chapter concludes with both proof-writing and computational exercises.

**Challenging Mathematical Problems with Elementary Solutions**

Passage to Abstract Mathematics helps students progress from a facility with computational procedures to an understanding of abstract mathematical concepts. Students develop their ability in mathematical communication through reading proofs, constructing proofs, and writing proofs in correct mathematical language. Concise, practical, and highly valuable, the text is ideal for students who have taken lower-division mathematics courses and need the tools requisite to study more advanced, abstract mathematics. The text features material that instructors of upper-level courses in set theory, analysis, topology, and modern algebra presume students have already learned by the time they enter advanced courses. It places emphasis on complete and correct definitions, as well as expressing mathematics in correct syntax. The core material consists of the first five closely knit chapters: Logic, Numbers, Sets, Functions, and Induction. To support active and continuous learning, exercises are embedded within the text material immediately following a definition or theorem. The explanatory comments, hints to solutions, and thought-provoking questions that appear within brackets throughout the text all serve to deepen the student's understanding of the material. In the second edition, the chapter entitled Functions precedes the chapter entitled Induction, and select material has been clarified or corrected. Number theoretic digressions such as Euclid's Algorithm and the Chinese Remainder Theorem have been deleted.
**A Transition to Advanced Mathematics**

A reader-friendly introduction to modern algebra with important examples from various areas of mathematics. Featuring a clear and concise approach, *A Transition to Advanced Mathematics* presents an integrated approach to basic concepts of modern algebra and highlights topics that play central roles in various branches of mathematics. The authors discuss key topics of abstract and modern algebra, including sets, number systems, groups, rings, and fields. The book begins with an exposition of the elements of set theory and moves on to cover the main ideas and branches of abstract algebra. In addition, the book includes: numerous examples throughout to deepen readers’ knowledge of the presented material, an exercise set after each chapter section in an effort to build a deeper understanding of the subject and improve knowledge retention, hints and answers to select exercises at the end of the book, a supplementary website with an instructor’s solutions manual. *A Transition to Essential Algebraic Structures* is an excellent textbook for introductory courses in abstract algebra as well as an ideal reference for anyone who would like to be more familiar with the basic topics of abstract algebra.

**Introduction to the Anisotropic Geometrodynamics**

This book covers the fundamentals of linear programming, extension of linear programming to discrete optimization methods, multi-objective functions, quadratic programming, geometric programming, and classical calculus methods for solving nonlinear programming problems.

**Discrete Mathematics: Introduction to Mathematical Reasoning**

This text is appropriate for any one-semester junior/senior level course in Modern Algebra, Abstract Algebra, Algebraic Structures, or Groups, Rings and Fields. Durbin has two main goals: to introduce the most important kinds of algebraic structures, and to help students improve their ability to understand and work with abstract ideas. The first six chapters present the core of the subject; the remainder are designed to be as flexible as possible. Durbin covers groups before rings, which is a matter of personal preference for instructors. The course is mostly comprised of mathematics majors, but you will find engineering and computer science majors as well.

**Introductory Concepts for Abstract Mathematics**

Susanna Epp’s *DISCRETE MATHEMATICS: AN INTRODUCTION TO MATHEMATICAL REASONING*, provides the same clear introduction to discrete mathematics and mathematical reasoning as her highly acclaimed *DISCRETE MATHEMATICS WITH APPLICATIONS*, but in a compact form that focuses on core topics and omits certain applications usually taught in other courses. The book is appropriate for use in a discrete mathematics course that emphasizes essential topics or in a mathematics major or minor course that serves as a transition to abstract mathematical thinking. The ideas of discrete mathematics underlie and are essential to the science and technology of the computer age. This book offers a synergistic union of the major themes of discrete mathematics together with the reasoning that underlies mathematical thought. Renowned for her lucid, accessible prose, Epp explains complex, abstract concepts with clarity and precision, helping students develop the ability to think abstractly as they study each topic. In doing so, the book provides students with a strong foundation both for computer science and for other upper-level mathematics courses. Important Notice: Media content referenced within the product description or the product text may not be available in the ebook version.

**Mathematical Programming for Operations Researchers and Computer Scientists**
Introduction to Abstract Mathematics focuses on the principles, approaches, and operations involved in abstract mathematics, including metric spaces, sets, axiom systems, and open sentences. The book first offers information on logic and set theory, natural numbers, and integers and rational numbers. Discussions focus on rational numbers and ordered fields, ordering, arithmetic, axiom systems and methods of proof, functions of kindred matters, ordered pairs and relations, sets, and statements and open sentences. The text then examines real and complex numbers, metric spaces, and limits. Topics include generalized limits, continuous functions, openness, closedness, and neighborhood systems, definition and basic properties, and construction of R. The publication is a vital reference for mathematicians and students interested in abstract mathematics.

Passage to Abstract Mathematics

The aim of the book is to provide a new and fruitful approach to the challenging problems of modern physics, astrophysics, and cosmology. The well-known observations of the flat rotation curves of spiral galaxies and of the gravitational lensing effect greatly exceeding the expectations based on the classical GRT can be explained without bringing in the notion of dark matter. The Tully-Fisher law and the unusual features of globular clusters' motion become clear. It also turns out that new features appear in the cosmological picture that involves the Universe expansion and the acceleration of the latter. The theory and the first observational results of the specific galactic scale experiment based on the optical-metrical parametric resonance are also discussed in the book. Instead of the direct measurements of the extremely small gravitational waves, it appears sufficient just to register their action on the radiation of the space masers. It can be done for special cases when the source of the gravitational wave is strictly periodic and presents a close binary system. When the amount of data obtained in such observations is large enough, it would be possible to judge upon the geometrical properties of the space-time region enveloping our galaxy, the Milky Way. The foundations of the new approach stem from the equivalence principle which is the basics of the classical GRT. In order to make the presentation self-contained, the roots of century-old ideas are discussed again. This makes the book interesting not only to the specialists in the field but also to graduates and ambitious undergraduate students.

An Invitation to Abstract Mathematics

This book introduces students to the world of advanced mathematics using algebraic structures as a unifying theme. Having no prerequisites beyond precalculus and an interest in abstract reasoning, the book is suitable for students of math education, computer science or physics who are looking for an easy-going entry into discrete mathematics, induction and recursion, groups and symmetry, and plane geometry. In its presentation, the book takes special care to forge linguistic and conceptual links between formal precision and underlying intuition, tending toward the concrete, but continually aiming to extend students' comfort with abstraction, experimentation, and non-trivial computation. The main part of the book can be used as the basis for a transition-to-proofs course that balances theory with examples, logical care with intuitive plausibility, and has sufficient informality to be accessible to students with disparate backgrounds. For students and instructors who wish to go further, the book also explores the Sylow theorems, classification of finitely-generated Abelian groups, and discrete groups of Euclidean plane transformations.

Introductory Concepts for Abstract Mathematics

The aim of this book is to help students write mathematics better. Throughout it are large exercise sets well-integrated with the text and varying appropriately from easy to hard. Basic issues are treated, and attention is given to small issues like not placing a mathematical symbol directly after a punctuation mark. And it provides many examples of what students should think and what they should write and how these two are often not the same.
Sets, Functions, and Logic

An indispensable companion to the book hailed an "expository masterpiece of the highest didactic value" by Zentralblatt MATH This solutions manual helps readers test and reinforce the understanding of the principles and real-world applications of abstract algebra gained from their reading of the critically acclaimed Introduction to Abstract Algebra. Ideal for students, as well as engineers, computer scientists, and applied mathematicians interested in the subject, it provides a wealth of concrete examples of induction, number theory, integers modulo n, and permutations. Worked examples and real-world problems help ensure a complete understanding of the subject, regardless of a reader's background in mathematics.

Pure Mathematics for Beginners - Solution Guide

A TRANSITION TO ADVANCED MATHEMATICS, 7e, International Edition helps students make the transition from calculus to more proofs-oriented mathematical study. The most successful text of its kind, the 7th edition continues to provide a firm foundation in major concepts needed for continued study and guides students to think and express themselves mathematically—to analyze a situation, extract pertinent facts, and draw appropriate conclusions. The authors place continuous emphasis throughout on improving students' ability to read and write proofs, and on developing their critical awareness for spotting common errors in proofs. Concepts are clearly explained and supported with detailed examples, while abundant and diverse exercises provide thorough practice on both routine and more challenging problems. Students will come away with a solid intuition for the types of mathematical reasoning they'll need to apply in later courses and a better understanding of how mathematicians of all kinds approach and solve problems.

Linear Algebra as an Introduction to Abstract Mathematics

Pure Mathematics for Beginners - Solution GuideThis book contains complete solutions to the problems in the 16 Problem Sets in Pure Mathematics for Beginners. Note that this book references examples and theorems from Pure Mathematics for Beginners. Therefore, it is strongly suggested that you purchase a copy of that book before purchasing this one.

A Book of Abstract Algebra

Beyond calculus, the world of mathematics grows increasingly abstract and places new and challenging demands on those venturing into that realm. As the focus of calculus instruction has become increasingly computational, it leaves many students ill prepared for more advanced work that requires the ability to understand and construct proofs. Introductory Concepts for Abstract Mathematics helps readers bridge that gap. It teaches them to work with abstract ideas and develop a facility with definitions, theorems, and proofs. They learn logical principles, and to justify arguments not by what seems right, but by strict adherence to principles of logic and proven mathematical assertions—and they learn to write clearly in the language of mathematics The author achieves these goals through a methodical treatment of set theory, relations and functions, and number systems, from the natural to the real. He introduces topics not usually addressed at this level, including the remarkable concepts of infinite sets and transfinite cardinal numbers Introductory Concepts for Abstract Mathematics takes readers into the world beyond calculus and ensures their voyage to that world is successful. It imparts a feeling for the beauty of mathematics and its internal harmony, and inspires an eagerness and increased enthusiasm for moving forward in the study of mathematics.

Modern Algebra, Instructor's Solutions Manual

The fundamental mathematical tools needed to understand machine learning include linear
algebra, analytic geometry, matrix decompositions, vector calculus, optimization, probability and statistics. These topics are traditionally taught in disparate courses, making it hard for data science or computer science students, or professionals, to efficiently learn the mathematics. This self-contained textbook bridges the gap between mathematical and machine learning texts, introducing the mathematical concepts with a minimum of prerequisites. It uses these concepts to derive four central machine learning methods: linear regression, principal component analysis, Gaussian mixture models and support vector machines. For students and others with a mathematical background, these derivations provide a starting point to machine learning texts. For those learning the mathematics for the first time, the methods help build intuition and practical experience with applying mathematical concepts. Every chapter includes worked examples and exercises to test understanding. Programming tutorials are offered on the book's web site.

Linear Algebra

Logic, Sets, and Numbers is a brief introduction to abstract mathematics that is meant to familiarize the reader with the formal and conceptual rigor that higher-level undergraduate and graduate textbooks commonly employ. Beginning with formal logic and a fairly extensive discussion of concise formulations of mathematical statements, the text moves on to cover general patterns of proofs, elementary set theory, mathematical induction, cardinality, as well as, in the final chapter, the creation of the various number systems from the integers up to the complex numbers. On the whole, the book's intent is not only to reveal the nature of mathematical abstraction, but also its inherent beauty and purity.

An Introduction to Essential Algebraic Structures

Introduction to Abstract Algebra provides insight into the methods of abstract algebra. This book provides information pertinent to the fundamental concepts of abstract algebra. Organized into five chapters, this book begins with an overview of the study of natural numbers that are used historically for the purpose of counting the objects in different assemblages. This text then examines the concepts of set and elements of a set. Other chapters contain an intuitive survey of the different kinds of real numbers, with the inclusion of many very important results on integers. This book presents as well a brief survey of algebraic systems from the trivial sets to the more highly structures groups, with emphasis on the elementary properties of groups. The final chapter deals with the simple development of complex numbers. This book is intended to be suitable for students in abstract algebra.

Solutions Manual to accompany Introduction to Abstract Algebra, 4e

Note: This is the 3rd edition. If you need the 2nd edition for a course you are taking, it can be found as a "other format" on amazon, or by searching its isbn: 1534970746 This gentle introduction to discrete mathematics is written for first and second year math majors, especially those who intend to teach. The text began as a set of lecture notes for the discrete mathematics course at the University of Northern Colorado. This course serves both as an introduction to topics in discrete math and as the "introduction to proof" course for math majors. The course is usually taught with a large amount of student inquiry, and this text is written to help facilitate this. Four main topics are covered: counting, sequences, logic, and graph theory. Along the way proofs are introduced, including proofs by contradiction, proofs by induction, and combinatorial proofs. The book contains over 470 exercises, including 275 with solutions and over 100 with hints. There are also Investigate! activities throughout the text to support active, inquiry based learning. While there are many fine discrete math textbooks available, this text has the following advantages: It is written to be used in an inquiry rich course. It is written to be used in a course for future math teachers. It is open source, with low cost print editions and free electronic editions. This third edition brings improved exposition, a new section on trees, and a bunch of new and improved exercises. For a complete list of changes, and to view the free electronic
Student Solutions Manual for Gallian's Contemporary Abstract Algebra

This book on Abstract Algebra is intended for one or two semesters of BS. (Hons.) and BA. (Prog.) of University of Delhi and other Universities of India. The book is written in simple language to make the students understand various topics in Abstract Algebra in an easier way. The examples and exercises of the book are meticulously crafted and honed to meet the need of the students who are keen to know about Abstract Algebra. Starting from Set Theory and covering the topics on Groups, Rings and Vector Spaces, the book provides the students a deep study of Abstract Algebra. The book 'Abstract Algebra' combines the theory, examples with exercises on the concepts related to the topics in Abstract Algebra.

Student Solutions Manual for A Transition to Abstract Mathematics

Praise for the Third Edition "... an expository masterpiece of the highest didactic value that has gained additional attractiveness through the various improvements ..."—Zentralblatt MATH The Fourth Edition of Introduction to Abstract Algebra continues to provide an accessible approach to the basic structures of abstract algebra: groups, rings, and fields. The book's unique presentation helps readers advance to abstract theory by presenting concrete examples of induction, number theory, integers modulo n, and permutations before the abstract structures are defined. Readers can immediately begin to perform computations using abstract concepts that are developed in greater detail later in the text. The Fourth Edition features important concepts as well as specialized topics, including: The treatment of nilpotent groups, including the Frattini and Fitting subgroups Symmetric polynomials The proof of the fundamental theorem of algebra using symmetric polynomials The proof of Wedderburn's theorem on finite division rings The proof of the Wedderburn-Artin theorem Throughout the book, worked examples and real-world problems illustrate concepts and their applications, facilitating a complete understanding for readers regardless of their background in mathematics. A wealth of computational and theoretical exercises, ranging from basic to complex, allows readers to test their comprehension of the material. In addition, detailed historical notes and biographies of mathematicians provide context for and illuminate the discussion of key topics. A solutions manual is also available for readers who would like access to partial solutions to the book's exercises. Introduction to Abstract Algebra, Fourth Edition is an excellent book for courses on the topic at the upper-undergraduate and beginning-graduate levels. The book also serves as a valuable reference and self-study tool for practitioners in the fields of engineering, computer science, and applied mathematics.

Bridge to Abstract Mathematics

Did you know that games and puzzles have given birth to many of today's deepest mathematical subjects? Now, with Douglas Ensley and Winston Crawley's Introduction to Discrete Mathematics, you can explore mathematical writing, abstract structures, counting, discrete probability, and graph theory, through games, puzzles, patterns, magic tricks, and real-world problems. You will discover how new mathematical topics can be applied to everyday situations, learn how to work with proofs, and develop your problem-solving skills along the way. Online applications help improve your mathematical reasoning. Highly intriguing, interactive Flash-based applications illustrate key mathematical concepts and help you develop your ability to reason mathematically, solve problems, and work with proofs. Explore More icons in the text direct you to online activities at www.wiley.com/college/ensley. Improve your grade with the Student Solutions Manual. A supplementary Student Solutions Manual contains more detailed solutions to selected exercises in the text.

Sets, Groups, and Mappings: An Introduction to Abstract Mathematics
Whereas many partial solutions and sketches for the odd-numbered exercises appear in the book, the Student Solutions Manual, written by the author, has comprehensive solutions for all odd-numbered exercises and a large number of even-numbered exercises. This Manual also offers many alternative solutions to those appearing in the text. These will provide the student with a better understanding of the material. This is the only available student solutions manual prepared by the author of Contemporary Abstract Algebra, Tenth Edition and is designed to supplement that text. The Table of Contents includes:

Integers and Equivalence Relations
0. Preliminaries

Groups
1. Introduction to Groups
2. Groups
3. Finite Groups; Subgroups
4. Cyclic Groups
5. Permutation Groups
6. Isomorphisms
7. Cosets and Lagrange's Theorem
8. External Direct Products
9. Normal Subgroups and Factor Groups
10. Group Homomorphisms
11. Fundamental Theorem of Finite Abelian Groups

Rings
12. Introduction to Rings
13. Integral Domains
14. Ideals and Factor Rings
15. Ring Homomorphisms
16. Polynomial Rings
17. Factorization of Polynomials
18. Divisibility in Integral Domains
19. Fields
20. Algebraic Extensions
21. Finite Fields
22. Geometric Constructions
23. Special Topics
24. Sylow Theorems
25. Generators and Relations
26. Symmetry Groups
27. Symmetry and Counting
28. Cayley Digraphs
29. Introduction to Algebraic Coding Theory
30. An Introduction to Galois Theory

Biography
Joseph A. Gallian earned his PhD from Notre Dame. In addition to receiving numerous national awards for his teaching and exposition, he has served terms as the Second Vice President, and the President of the MAA. He has served on 40 national committees, chairing ten of them. He has published over 100 articles and authored six books. Numerous articles about his work have appeared in the national news outlets, including the New York Times, the Washington Post, the Boston Globe, and Newsweek, among many others.

Introduction to Abstract Mathematics

Beyond calculus, the world of mathematics grows increasingly abstract and places new and challenging demands on those venturing into that realm. As the focus of calculus instruction has become increasingly computational, it leaves many students ill-prepared for more advanced work that requires the ability to understand and construct proofs. Introductory Concepts for Abstract Mathematics helps readers bridge that gap. It teaches them to work with abstract ideas and develop a facility with definitions, theorems, and proofs. They learn logical principles, and to justify arguments not by what seems right, but by strict adherence to principles of logic and proven mathematical assertions - and they learn to write clearly in the language of mathematics. The author achieves these goals through a methodical treatment of set theory, relations and functions, and number systems, from the natural to the real. He introduces topics not usually addressed at this level, including the remarkable concepts of infinite sets and transfinite cardinal numbers. Introductory Concepts for Abstract Mathematics takes readers into the world beyond calculus and ensures their voyage to that world is successful. It imparts a feeling for the beauty of mathematics and its internal harmony, and inspires an eagerness and increased enthusiasm for moving forward in the study of mathematics.

An Introduction to Abstract Mathematics

Accessible but rigorous, this outstanding text encompasses all of the topics covered by a typical course in elementary abstract algebra. Its easy-to-read treatment offers an intuitive approach, featuring informal discussions followed by thematically arranged exercises. This second edition features additional exercises to improve student familiarity with applications. 1990 edition.

Introduction to Abstract Algebra

This text is designed for students who are preparing to take a post-calculus abstract algebra and analysis course. Morash concentrates on providing students with the basic tools (sets, logic and proof techniques) needed for advanced study in mathematics. The
first six chapters of the text are devoted to these basics, and these topics are reinforced throughout the remainder of the text. Morash guides students through the transition from a calculus-level courses upper-level courses that have significant abstract mathematical content.

**Discrete Mathematics**

This is a book about mathematics and mathematical thinking. It is intended for the serious learner who is interested in studying some deductive strategies in the context of a variety of elementary mathematical situations. No background beyond single-variable calculus is presumed.

**An Introduction to Abstract Algebra**

This book is an introduction to the theory of calculus in the style of inquiry-based learning. The text guides students through the process of making mathematical ideas rigorous, from investigations and problems to definitions and proofs. The format allows for various levels of rigor as negotiated between instructor and students, and the text can be of use in a theoretically oriented calculus course or an analysis course that develops rigor gradually. Material on topology (e.g., of higher dimensional Euclidean spaces) and discrete dynamical systems can be used as excursions within a study of analysis or as a more central component of a course. The themes of bisection, iteration, and nested intervals form a common thread throughout the text. The book is intended for students who have studied some calculus and want to gain a deeper understanding of the subject through an inquiry-based approach.

**Mathematics for Machine Learning**

Written for junior and senior undergraduates, this remarkably clear and accessible treatment covers set theory, the real number system, metric spaces, continuous functions, Riemann integration, multiple integrals, and more. 1968 edition.
Explorations in Analysis, Topology, and Dynamics: An Introduction to Abstract Mathematics

Bond and Keane explicate the elements of logical, mathematical argument to elucidate the meaning and importance of mathematical rigor. With definitions of concepts at their disposal, students learn the rules of logical inference, read and understand proofs of theorems, and write their own proofs all while becoming familiar with the grammar of mathematics and its style. In addition, they will develop an appreciation of the different methods of proof (contradiction, induction), the value of a proof, and the beauty of an elegant argument. The authors emphasize that mathematics is an ongoing, vibrant disciplineits long, fascinating history continually intersects with territory still uncharted and questions still in need of answers. The authors extensive background in teaching mathematics shines through in this balanced, explicit, and engaging text, designed as a primer for higher-level mathematics courses. They elegantly demonstrate process and application and recognize the byproducts of both the achievements and the missteps of past thinkers. Chapters 1-5 introduce the fundamentals of abstract mathematics and chapters 6-8 apply the ideas and techniques, placing the earlier material in a real context. Readers interest is continually piqued by the use of clear explanations, practical examples, discussion and discovery exercises, and historical comments.

Introduction to Mathematical Structures and Proofs

This undergraduate textbook promotes an active transition to higher mathematics. Problem solving is the heart and soul of this book: each problem is carefully chosen to demonstrate, elucidate, or extend a concept. More than 300 exercises engage the reader in extensive arguments and creative approaches, while exploring connections between fundamental mathematical topics. Divided into four parts, this book begins with a playful exploration of the building blocks of mathematics, such as definitions, axioms, and proofs. A study of the fundamental concepts of logic, sets, and functions follows, before focus turns to methods of proof. Having covered the core of a transition course, the author goes on to present a selection of advanced topics that offer opportunities for extension or further study. Throughout, appendices touch on historical perspectives, current trends, and open questions, showing mathematics as a vibrant and dynamic human enterprise. This second edition has been reorganized to better reflect the layout and curriculum of standard transition courses. It also features recent developments and improved appendices. An Invitation to Abstract Mathematics is ideal for those seeking a challenging and engaging transition to advanced mathematics, and will appeal to both undergraduates majoring in mathematics, as well as non-math majors interested in exploring higher-level concepts. From reviews of the first edition: Bajnok’s new book truly invites students to enjoy the beauty, power, and challenge of abstract mathematics. The book can be used as a text for traditional transition or structure courses but since Bajnok invites all students, not just mathematics majors, to enjoy the subject, he assumes very little background knowledge. Jill Dietz, MAA Reviews The style of writing is careful, but joyously enthusiastic. The author’s clear attitude is that mathematics consists of problem solving, and that writing a proof falls into this category. Students of mathematics are, therefore, engaged in problem solving, and should be given problems to solve, rather than problems to imitate. The author attributes this approach to his Hungarian background and encourages students to embrace the challenge in the same way an athlete engages in vigorous practice. John Perry, zbMATH

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