

Invitation To Discrete Mathematics By Jir Matousek

Based on a well-received course designed for philosophy students, this book is an informal introduction to mathematical thinking. The work will be rewarding not only for philosophers concerned with mathematical questions but also for serious amateur mathematicians with an interest in the "frontiers" as well as the foundations of mathematics. In what might be termed a sampler of the discipline, Konrad Jacobs discusses an unusually wide range of topics, including such items of contemporary interest as knot theory, optimization theory, and dynamical systems. Using Euclidean geometry and algebra to introduce the mathematical mode of thought, the author then turns to recent developments. In the process he offers what he calls a "Smithsonian of mathematical showpieces": the five Platonic Solids, the Mbius Strip, the Cantor Discontinuum, the Peano Curve, Reidemeister's Knot Table, the plane ornaments, Alexander's Horned Sphere, and Antoine's Necklace. The treatments of geometry and algebra are followed by a chapter on induction and one on optimization, game theory, and mathematical economics. The chapter on topology includes a discussion of topological spaces and continuous mappings, curves and knots, Euler's polyhedral formula for surfaces, and the fundamental group. The last chapter deals with dynamics and contains material on the Game of Life, circle rotation, Smale's "horseshoe," and stability and instability, among other topics.

Invitation to Discrete MathematicsOxford University Press

This book was first published in 2003. Combinatorica, an extension to the popular computer algebra system Mathematica®, is the most comprehensive software available for teaching and research applications of discrete mathematics, particularly combinatorics and graph theory. This book is the definitive reference/user's guide to Combinatorica, with examples of all 450 Combinatorica functions in action, along with the associated mathematical and algorithmic theory. The authors cover classical and advanced topics on the most important combinatorial objects: permutations, subsets, partitions, and Young tableaux, as well as all important areas of graph theory: graph construction operations, invariants, embeddings, and algorithmic graph theory. In addition to being a research tool, Combinatorica makes discrete mathematics accessible in new and exciting ways to a wide variety of people, by encouraging computational experimentation and visualization. The book contains no formal proofs, but enough discussion to understand and appreciate all the algorithms and theorems it contains.

Paul Erdős published more papers during his lifetime than any other mathematician, especially in discrete mathematics. He had a nose for beautiful, simply-stated problems with solutions that have far-reaching consequences across mathematics. This captivating book, written for students, provides an easy-to-understand introduction to discrete mathematics by presenting questions that intrigued Erdős, along with his brilliant ways of working toward their answers. It includes young Erdős's proof of Bertrand's postulate, the Erdős-Szekeres Happy End Theorem, De Bruijn-Erdős theorem, Erdős-Rado delta-systems, Erdős-Ko-Rado theorem, Erdős-Stone theorem, the Erdős-Rényi-Sós Friendship Theorem, Erdős-Rényi random graphs, the Chvátal-Erdős theorem on Hamilton cycles, and other results of Erdős, as well as results related to his work, such as Ramsey's theorem or Deza's theorem on weak delta-systems. Its appendix covers topics normally missing from introductory courses. Filled with personal anecdotes about Erdős, this book offers a behind-the-scenes look at interactions with the legendary collaborator.

A Problem-Solving Primer

An Open Introduction

Mathematics for Social Justice: Resources for the College Classroom

A Course in Enumeration

Computational Discrete Mathematics

Active student engagement is key to this classroom-tested combinatorics text, boasting 1200+ carefully designed problems, ten mini-projects, section warm-up problems, and chapter opening problems. The author - an award-winning teacher - writes in a conversational style, keeping the reader in mind on every page. Students will stay motivated through glimpses into current research trends and open problems as well as the history and global origins of the subject. All essential topics are covered, including Ramsey theory, enumerative combinatorics including Stirling numbers, partitions of integers, the inclusion-exclusion principle, generating functions, introductory graph theory, and partially ordered sets. Some significant results are presented as sets of guided problems, leading readers to discover them on their own. More than 140 problems have complete solutions and over 250 have hints in the back, making this book ideal for self-study. Ideal for a one semester upper undergraduate course, prerequisites include the calculus sequence and familiarity with proofs.

Invitation to Discrete Mathematics is an introduction and a thoroughly comprehensive text at the same time. A lively and entertaining style with mathematical precision and maturity uniquely combine into an intellectual happening and should delight the interested reader. A master example of teaching contemporary discrete mathematics, and of teaching science in general.

Combinatorial enumeration is a readily accessible subject full of easily stated, but sometimes tantalizingly difficult problems. This book leads the reader in a leisurely way from basic notions of combinatorial enumeration to a variety of topics, ranging from algebra to statistical physics. The book is organized in three parts: Basics, Methods, and Topics. The aim is to introduce readers to a fascinating field, and to offer a sophisticated source of information for professional mathematicians desiring to learn more. There are 666 exercises, and every chapter ends with a highlight section, discussing in detail a particularly beautiful or famous result.

The aim of this volume is to explain the differences between research-level mathematics and the maths taught at school. Most differences are philosophical and the first few chapters are about general aspects of mathematical thought.

Discrete Mathematics and Its Applications

A Concise Introduction, Solutions Manual

Invitation to the Game

The Discrete Mathematical Charms of Paul Erdős

Computing the Continuous Discretely

This text is designed for those who wish to study mathematics beyond linear algebra but are unready for abstract material. Rather than a theorem-proof-corollary exposition, it stresses geometry, intuition, and dynamical systems. 1996 edition.

The book concludes with a survey of recent developments on coloring graphs on surfaces.

Aimed at undergraduate mathematics and computer science students, this book is an excellent introduction to a lot of problems of discrete mathematics. It discusses a number of selected results and methods, mostly from areas of combinatorics and graph theory, and it uses proofs and problem solving to help students understand the so-called figures, and exercises are spread throughout the book.

Sums of Squares of Integers covers topics in combinatorial number theory as they relate to counting representations of integers as sums of a certain number of squares. The book introduces a stimulating area of number theory where research continues to proliferate. It is a book of "firsts" - namely it is the first book to combine Liouville's methods of modular functions to study the representation of integers as sums of squares. It is the first book to tell how to compute the number of representations of an integer n as the sum of s squares of integers for any s and n. It is also the first book to give a proof of Szemerédi's theorem, and is the first number theory book to discuss complements and clarifies the classical fundamental results about sums of squares. The book presents several existing, yet still interesting and instructive, examples of modular forms. Two chapters develop useful properties of the Bernoulli numbers and illustrate arithmetic progressions, proving the theorems of van der Waerden, Roth, and Erdős, and applications of the theory to three problems that lie outside of number theory in the areas of cryptanalysis, microwave radiation, and diamond cutting. The text is complemented by the inclusion of over one hundred exercises to test the reader's understanding.

An Invitation to Applied Category Theory

Algebraic and Discrete Mathematical Methods for Modern Biology

Graph Theory in Memory of G.A. Dirac

Excerpts from "Invitation to Discrete Mathematics."

Integer-Point Enumeration in Polyhedra

An introduction to the basic tools of the theory of (partially) ordered sets such as visualization via diagrams, subsets, homomorphisms, important order-theoretical constructions and classes of ordered sets. Using a thematic approach, the author presents open or recently solved problems to motivate the development of constructions and investigations for new classes of ordered sets. The text can be used as a focused follow-up or companion to a first proof (set theory and relations) or graph theory course.

A precise, relevant, comprehensive approach to mathematical concepts...

Graphs are usually represented as geometric objects drawn in the plane, consisting of nodes and curves connecting them. The main message of this book is that such a representation is not merely a way to visualize the graph, but an important mathematical tool. It is obvious that this geometry is crucial in engineering, for example, if you want to understand rigidity of frameworks and mobility of mechanisms. But even if there is no geometry directly connected to the graph-theoretic problem, a well-chosen geometric embedding has mathematical meaning and applications in proofs and algorithms. This book surveys a number of such connections between graph theory and geometry: among others, rubber band representations, coin representations, orthogonal representations, and discrete analytic functions. Applications are given in information theory, statistical physics, graph algorithms and quantum physics. The book is based on courses and lectures that the author has given over the last few decades and offers readers with some knowledge of graph theory, linear algebra, and probability a thorough introduction to this exciting new area with a large collection of illuminating examples and exercises.

This richly illustrated textbook explores the amazing interaction between combinatorics, geometry, number theory, and analysis which arises in the interplay between polyhedra and lattices. Highly accessible to advanced undergraduates, as well as beginning graduate students, this second edition is perfect for a capstone course, and adds two new chapters, many new exercises, and updated open problems. For scientists, this text can be utilized as a self-contained tooling device. The topics include a friendly invitation to Ehrhart's theory of counting lattice points in polytopes, finite Fourier analysis, the Frobenius coin-exchange problem, Dedekind sums, solid angles, Euler-Maclaurin summation for polytopes, computational geometry, magic squares, zonotopes, and more. With more than 300 exercises and open research problems, the reader is an active participant, carried through diverse but tightly woven mathematical fields that are inspired by an innocently elementary question: What are the relationships between the continuous volume of a polytope and its discrete volume? Reviews of the first edition: "You owe it to yourself to pick up a copy of Computing the Continuous Discretely to read about a number of interesting problems in geometry, number theory, and combinatorics." – MAA Reviews "The book is written as an accessible and engaging textbook, with many examples, historical notes, pithy quotes, commentary integrating the material, exercises, open problems and an extensive bibliography." – Zentralblatt MATH "This beautiful book presents, at a level suitable for advanced undergraduates, a fairly complete introduction to the problem of counting lattice points inside a convex polyhedron." – Mathematical Reviews "Many departments recognize the need for capstone courses in which graduating students can see the tools they have acquired come together in some satisfying way. Beck and Robins have written the perfect text for such a course." – CHOICE

An Invitation to the Rogers-Ramanujan Identities

Mathematical Reasoning and Proof with Puzzles, Patterns, and Games

Logic and Discrete Mathematics

Invitation to Dynamical Systems

Graphs on Surfaces

Unemployed after high school in the highly robotic society of 2154, Lisse and seven friends resign themselves to a boring existence in their "Designated Area" until the government invites them to play The Game.

This textbook provides an engaging and motivational introduction to traditional topics in discrete mathematics, in a manner specifically designed to appeal to computer science students. The text empowers students to think critically, to be effective problem solvers, to integrate theory and practice, and to recognize the importance of abstraction. Clearly structured and interactive in nature, the book presents detailed walkthroughs of several algorithms, stimulating a conversation with the reader through informal commentary and provocative questions. Features: no university-level background in mathematics required; ideally structured for classroom-use and self-study, with modular chapters following ACM curriculum recommendations; describes mathematical processes in an algorithmic manner; contains examples and exercises throughout the text, and highlights the most important concepts in each section; selects examples that demonstrate a practical use for the concept in question.

This volume is a tribute to the life and mathematical work of G.A. Dirac (1925–1984). One of the leading graph theorists, he developed methods of great originality and made many fundamental discoveries. The forty-two papers are all concerned with (or related to) Dirac's main lines of research. A number of mathematicians pay tribute to his memory by presenting new results in different areas of graph theory. Among the topics included are paths and cycles, hamiltonian graphs, vertex colouring and critical graphs, graphs and surfaces, edge-colouring, and infinite graphs. Some of the papers were originally presented at a meeting held in Denmark in 1985. Attendance being by invitation only, some 55 mathematicians from 14 countries participated in various lectures and discussions on graph theory related to the work of Dirac. This volume contains contributions from others as well, so should not be regarded only as the proceedings of that meeting. A problems section is included, as well as a listing of Dirac's own publications.

The book is an introductory textbook mainly for students of computer science and mathematics. Our guiding phrase is "what every theoretical computer scientist should know about linear programming". A major focus is on applications of linear programming, both in practice and in theory. The book is concise, but at the same time, the main results are covered with complete proofs and in sufficient detail, ready for presentation in class. The book does not require more prerequisites than basic linear algebra, which is summarized in an appendix. One of its main goals is to help the reader to see linear programming "behind the scenes".

Discrete Mathematics for Computing

Understanding and Using Linear Programming

An Invitation to Abstract Mathematics

An Invitation to Quantum Field Theory

Elementary and Beyond

Solutions manual to accompany Logic and Discrete Mathematics: A Concise Introduction This book features a unique combination of comprehensive coverage of logic with a solid exposition of the most important fields of discrete mathematics, presenting material that has been tested and refined by the authors in university courses taught over more than a decade. Written in a clear and reader-friendly style, each section ends with an extensive set of exercises, most of them provided with complete solutions which are available in this accompanying solutions manual.

Did you know that games and puzzles have given birth to many of today's deepest mathematical subjects? Now, with Douglas Ensley and Winston Crowley'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.

This book is a short, concise introduction to key mathematical ideas for computing students which develops their understanding of discrete mathematics and its application in computing. The topics are presented in a well defined, logical order that build upon each other and are constantly reinforced by worked examples. Reliance on students' previous mathematical experience is kept to a minimum, though some basic algebraic manipulation is required. This book is appropriate for CS and Math students in an undergraduate Discrete Math course. The content constitutes an accepted core of mathematics for computer scientists (for example, the formal methods used in computer science draw heavily on the discrete mathematical concepts covered here, particularly logic, sets, relations and functions). Emphasis is placed on clear and careful explanations of basic ideas and on building confidence in developing mathematical competence through carefully selected exercises. All chapters conclude with short applications/case studies relevant to computing, which provide further motivation to engage with the mathematical ideas involved, and also demonstrate how the mathematics can be applied in a computing context.

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 version of the text, visit the book's website at discrete.openmathbooks.org

Student Solutions Guide for Discrete Mathematics and Its Applications

A Simple Introduction

Sums of Squares of Integers

Mathematics and Computation

This book provides an introduction to Quantum Field Theory (QFT) at an elementary level—with only special relativity, electromagnetism and quantum mechanics as prerequisites. For this fresh approach to teaching QFT, based on numerous lectures and courses given by the authors, a representative sample of topics has been selected containing some of the more innovative, challenging or subtle concepts. They are presented with a minimum of technical details, the discussion of the main ideas being more important than the presentation of the typically very technical mathematical details necessary to obtain the final results. Special attention is given to the realization of symmetries in particle physics: global and local symmetries, explicit, spontaneously broken, and anomalous continuous symmetries, as well as discrete symmetries. Beyond providing an overview of the standard model of the strong, weak and electromagnetic interactions and the current understanding of the origin of mass, the text enumerates the general features of renormalization theory as well as providing a cursory description of effective field theories and the problem of naturalness in physics. Among the more advanced topics the reader will find are an outline of the first principles derivation of the CPT theorem and the spin-statistics connection. As indicated by the title, the main aim of this text is to motivate the reader to study QFT by providing a self-contained and approachable introduction to the most exciting and challenging aspects of this successful theoretical framework.

An introduction to computational complexity theory, its connections and interactions with mathematics, and its central role in the natural and social sciences, technology, and philosophy Mathematics and Computation provides a broad, conceptual overview of computational complexity theory—the mathematical study of efficient computation. With important practical applications to computer science and industry, computational complexity theory has evolved into a highly interdisciplinary field, with strong links to most mathematical areas and to a growing number of scientific endeavors. Avi Wigderson takes a sweeping survey of complexity theory, emphasizing the field’s insights and challenges. He explains the ideas and motivations leading to key models, notions, and results. In particular, he looks at algorithms and complexity, computations and proofs, randomness and interaction, quantum and arithmetic computation, and cryptography and learning, all as parts of a cohesive whole with numerous cross-influences. Wigderson illustrates the immense breadth of the field, its beauty and richness, and its diverse and growing interactions with other areas of mathematics. He ends with a comprehensive look at the theory of computation, its methodology and aspirations, and the unique and fundamental ways in which it has shaped and will further shape science, technology, and society. For further reading, an extensive bibliography is provided for all topics covered. Mathematics and Computation is useful for undergraduate and graduate students in mathematics, computer science, and related fields, as well as researchers and teachers in these fields. Many parts require little background, and serve as an invitation to newcomers seeking an introduction to the theory of computation. Comprehensive coverage of computational complexity theory, and beyond High-level, intuitive exposition, which brings conceptual clarity to this central and dynamic scientific discipline Historical accounts of the evolution and motivations of central concepts and models A broad view of the theory of computation’s influence on science, technology, and society Extensive bibliography

Analytic combinatorics aims to enable precise quantitative predictions of the properties of large combinatorial structures. The theory has emerged over recent decades as essential both for the analysis of algorithms and for the study of scientific models in many disciplines, including probability theory, statistical physics, computational biology, and information theory. With a careful combination of symbolic enumeration methods and complex analysis, drawing heavily on generating functions, results of sweeping generality emerge that can be applied in particular to fundamental structures such as permutations, sequences, strings, walks, paths, trees, graphs and maps. This account is the definitive treatment of the topic. The authors give full coverage of the underlying mathematics and a thorough treatment of both classical and modern applications of the theory. The text is complemented with exercises, examples, appendices and notes to aid understanding. The book can be used for an advanced undergraduate or a graduate course, or for self-study.

Mathematics for Social Justice offers a collection of resources for mathematics faculty interested in incorporating questions of social justice into their classrooms. The book begins with a series of essays from instructors experienced in integrating social justice themes into their pedagogy; these essays contain political and pedagogical motivations as well as nuts-and-bolts teaching advice. The heart of the book is a collection of fourteen classroom-tested modules featuring ready-to-use activities and investigations for the college mathematics classroom. The mathematical tools and techniques used are relevant to a wide variety of courses including college algebra, math for the liberal arts, calculus, differential equations, discrete mathematics, geometry, financial mathematics, and combinatorics. The social justice themes include human trafficking, income inequality, environmental justice, gerrymandering, voting methods, and access to education. The volume editors are leaders of the national movement to include social justice material into mathematics teaching. Gizem Karaali is Associate Professor of Mathematics at Pomona College. She is one of the founding editors of The Journal of Humanistic Mathematics, and an associate editor for The Mathematical Intelligencer and Numeracy ; she also serves on the editorial board of the MAA’s Carus Mathematical Monographs. Lily Khadjavi is Associate Professor of Mathematics at Loyola Marymount University and is a past co-chair of the Infinite Possibilities Conference. She has served on the boards of Building Diversity in Science, the Barbara Jordan-Bayard Rustin Coalition, and the Harvard Gender and Sexuality Caucus.

An Invitation to Combinatorics
 Seven Sketches in Compositionality
 An Introduction
 Essentials of Discrete Mathematics
 Invitation to Mathematics

Written for the one-term course, the Third Edition of Essentials of Discrete Mathematics is designed to serve computer science majors as well as students from a wide range of disciplines. The material is organized around five types of thinking: logical, relational, recursive, quantitative, and analytical. This presentation results in a coherent outline that steadily builds upon mathematical sophistication. Graphs are introduced early and referred to throughout the text, providing a richer context for examples and applications. tudents will encounter algorithms near the end of the text, after they have acquired the skills and experience needed to analyze them. The final chapter contains in-depth case studies from a variety of fields, including biology, sociology, linguistics, economics, and music.

Written by experts in both mathematics and biology, Algebraic and Discrete Mathematical Methods for Modern Biology offers a bridge between math and biology, providing a framework for simulating, analyzing, predicting, and modulating the behavior of complex biological systems. Each chapter begins with a question from modern biology, followed by the description of certain mathematical methods and theory appropriate in the search of answers. Every topic provides a fast-track pathway through the problem by presenting the biological foundation, covering the relevant mathematical theory, and highlighting connections between them. Many of the projects and exercises embedded in each chapter utilize specialized software, providing students with much-needed familiarity and experience with computing applications, critical components of the "modern biology" skill set. This book is appropriate for mathematics courses such as finite mathematics, discrete structures, linear algebra, abstract/modern algebra, graph theory, probability, bioinformatics, statistics, biostatistics, and modeling, as well as for biology courses such as genetics, cell and molecular biology, biochemistry, ecology, and evolution. Examines significant questions in modern biology and their mathematical treatments Presents important mathematical concepts and tools in the context of essential biology Features material of interest to students in both mathematics and biology Presents chapters in modular format so coverage need not follow the Table of Contents Introduces projects appropriate for undergraduate research Utilizes freely accessible software for visualization, simulation, and analysis in modern biology Requires no calculus as a prerequisite Provides a complete Solutions Manual Features a companion website with supplementary resources

*Essential for all biology and biomathematics courses, this textbook provides students with a fresh perspective of quantitative techniques in biology in a field where virtually any advance in the life sciences requires a sophisticated mathematical approach. An Invitation to Biomathematics, expertly written by a team of experienced educators, offers students a solid understanding of solving biological problems with mathematical applications. This text succeeds in enabling students to truly experience advancements made in biology through mathematical models by containing computer-based hands-on laboratory projects with emphasis on model development, model validation, and model refinement. The supplementary work, Laboratory Manual of Biomathematics is available separately ISBN 0123740223, or as a set ISBN: 0123740290) * Provides a complete guide for development of quantification skills crucial for applying mathematical methods to biological problems * Includes well-known examples from across disciplines in the life sciences including modern biomedical research * Explains how to use data sets or dynamical processes to build mathematical models * Offers extensive illustrative materials * Written in clear and easy-to-follow language without assuming a background in math or biology * A laboratory manual is available for hands-on, computer-assisted projects based on material covered in the text*

The Rogers–Ramanujan identities are a pair of infinite series—infinite product identities that were first discovered in 1894. Over the past several decades these identities, and identities of similar type, have found applications in number theory, combinatorics, Lie algebra and vertex operator algebra theory, physics (especially statistical mechanics), and computer science (especially algorithmic proof theory). Presented in a coherent and clear way, this will be the first book entirely devoted to the Rogers—Ramanujan identities and will include related historical material that is unavailable elsewhere.

Ordered Sets
 An Invitation to Biomathematics
 Analytic Combinatorics
 Laboratory Manual of Biomathematics

Concrete Mathematics: A Foundation for Computer Science
This textbook provides an accessible introduction to the rich and beautiful area of hyperplane arrangement theory, where discrete mathematics, in the form of combinatorics and arithmetic, meets continuous mathematics, in the form of the topology and Hodge theory of complex algebraic varieties. The topics discussed in this book range from elementary combinatorics and discrete geometry to more advanced material on mixed Hodge structures, logarithmic connections and Milnor fibrations. The author covers a lot of ground in a relatively short amount of space, with a focus on defining concepts carefully and giving proofs of theorems in detail where needed. Including a number of surprising results and tantalizing open problems, this timely book also serves to acquaint the reader with the rapidly expanding literature on the subject. Hyperplane Arrangements will be particularly useful to graduate students and researchers who are interested in algebraic geometry or algebraic topology. The book contains numerous exercises at the end of each chapter, making it suitable for courses as well as self-study.

This volume is a collection of articles written by experienced primary, secondary, and collegiate educators. The book explains why discrete mathematics should be taught in K-12 classrooms and offers practical guidance on how to do so. In this book, teachers at all levels will find a great deal of valuable material to help them introduce discrete mathematics in their classrooms. One main article provides a comprehensive and detailed view of discrete mathematics for K-12. Another surveys the resources that are available for teachers. School and district curriculum leaders will find material that addresses how discrete mathematics can be introduced into their curricula. College faculty members will find ideas and topics that can be incorporated into a variety of courses.It features: classroom activities and an annotated list of resources; authors who are directors of innovative programs and who are well known for their work; a description of discrete mathematics providing the opportunity for a fresh start for students who have been previously unsuccessful in mathematics; discussion on discrete mathematics as it is used to achieve the goals of the current effort to improve mathematics education; guidance on topics, resources and teaching; and a valuable guide for both pre-service and in-service professional development.

Designed as supplemental material to the textbook An Invitation to Biomathematics, this laboratory manual expertly aids students who wish to gain a deeper understanding of solving biological issues with computer programs. This manual provides hands-on exploration of model development, model validation, and model refinement, enabling students to truly experience advancements made in biology by mathematical models. Each of the projects offered can be used as individual module in traditional biology or mathematics courses such as calculus, ordinary differential equations, elementary probability, statistics, and genetics. This manual is a companion to the textbook, An Invitation of Biomathematics (sold separately ISBN: 0120887711; or as a set ISBN: 0123740290). * Can be used as a computer lab component of a course in biomathematics or as homework projects for independent student work * Biological topics include: Ecology, Toxicology, Microbiology, Epidemiology, Genetics, Biostatistics, Physiology, Cell Biology, and Molecular Biology * Mathematical topics include: Discrete and continuous dynamical systems, difference equations, differential equations, probability distributions, statistics, data transformation, risk function, statistics, approximate entropy, periodic components, and pulse-detection algorithms * Includes more than 120 exercises derived from ongoing research studies
Category theory reveals commonalities between structures of all sorts. This book shows its potential in science, engineering, and beyond.

A Theory Revolutionizing Technology and Science
 Discrete Mathematics
 MAT 344

Graphs and Geometry
 Combinatorics and Graph Theory with Mathematica ®

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

This text provides a balanced survey of major sub-fields within discrete mathematics. It demonstrates the utility of discrete mathematics in the solutions of real-world problems in diverse areas such as zoology, linguistics and business. Over 200 new problems have been added to this third edition.
 Discrete Mathematics in the Schools
 Invitation to Discrete Mathematics
 Mathematics: A Very Short Introduction
 Hyperplane Arrangements
 Fundamentals of Discrete Math for Computer Science