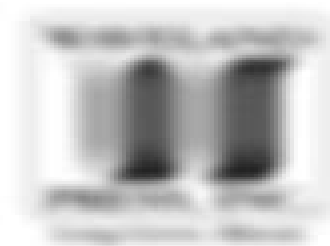

DISCRETE MATHEMATICS

Gary Chartrand and Ping Zhang

Western Michigan University



Discrete Mathematics By Gary Chartrand Ping Zhang

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Discrete Mathematics Gary Chartrand, Ping Zhang, 2011-03-31 Chartrand and Zhang's Discrete Mathematics presents a clearly written student friendly introduction to discrete mathematics. The authors draw from their background as researchers and educators to offer lucid discussions and descriptions fundamental to the subject of discrete mathematics. Unique among discrete mathematics textbooks for its treatment of proof techniques and graph theory topics discussed also include logic relations and functions especially equivalence relations and bijective functions algorithms and analysis of algorithms introduction to number theory combinatorics counting the Pascal triangle and the binomial theorem discrete probability partially ordered sets lattices and Boolean algebras cryptography and finite state machines. This highly versatile text provides mathematical background used in a wide variety of disciplines including mathematics and mathematics education computer science biology chemistry engineering communications and business. Some of the major features and strengths of this textbook: Numerous carefully explained examples and applications facilitate learning. More than 1 600 exercises ranging from elementary to challenging are included with hints answers to all odd numbered exercises. Descriptions of proof techniques are accessible and lively. Students benefit from the historical discussions throughout the textbook.

Discrete Mathematics and Applications Kevin Ferland, 2017-09-19 Discrete Mathematics and Applications Second Edition is intended for a one semester course in discrete mathematics. Such a course is typically taken by mathematics mathematics education and computer science majors usually in their sophomore year. Calculus is not a prerequisite to use this book. Part one focuses on how to write proofs then moves on to topics in number theory employing set theory in the process. Part two focuses on computations combinatorics graph theory trees and algorithms. Emphasizes proofs which will appeal to a subset of this course market. Links examples to exercise sets. Offers edition that has been heavily reviewed and developed. Focuses on graph theory. Covers trees and algorithms.

Introductory Discrete Mathematics V. K. Balakrishnan, 2012-04-30 This concise undergraduate level text focuses on combinatorics graph theory with applications to some standard network optimization problems and algorithms. More than 200 exercises many with complete solutions. 1991 edition.

Handbook of Discrete and Combinatorial Mathematics Kenneth H. Rosen, 2017-10-19 Handbook of Discrete and Combinatorial Mathematics provides a comprehensive reference volume for mathematicians computer scientists engineers as well as students and reference librarians. The material is presented so that key information can be located and used quickly and easily. Each chapter includes a glossary. Individual topics are covered in sections and subsections within chapters each of which is organized into clearly identifiable parts definitions facts and examples. Examples are provided to illustrate some of the key definitions facts and algorithms. Some curious and entertaining facts and puzzles are also included. Readers will also find an extensive collection of biographies. This second edition is a major revision. It includes extensive additions and updates. Since the first edition appeared in 1999 many new discoveries have been made and new areas have grown in importance.

which are covered in this edition *Discrete Structures and Their Interactions* Jason I. Brown, 2016-04-19 Discover the Connections between Different Structures and Fields *Discrete Structures and Their Interactions* highlights the connections among various discrete structures including graphs directed graphs hypergraphs partial orders finite topologies and simplicial complexes It also explores their relationships to classical areas of mathematics [Chromatic Graph Theory](#) Gary Chartrand, Ping Zhang, 2019-11-28 With *Chromatic Graph Theory* Second Edition the authors present various fundamentals of graph theory that lie outside of graph colorings including basic terminology and results trees and connectivity Eulerian and Hamiltonian graphs matchings and factorizations and graph embeddings Readers will see that the authors accomplished the primary goal of this textbook which is to introduce graph theory with a coloring theme and to look at graph colorings in various ways The textbook also covers vertex colorings and bounds for the chromatic number vertex colorings of graphs embedded on surfaces and a variety of restricted vertex colorings The authors also describe edge colorings monochromatic and rainbow edge colorings complete vertex colorings several distinguishing vertex and edge colorings Features of the Second Edition The book can be used for a first course in graph theory as well as a graduate course The primary topic in the book is graph coloring The book begins with an introduction to graph theory so assumes no previous course The authors are the most widely published team on graph theory Many new examples and exercises enhance the new edition [A First Course in Graph Theory](#) Gary Chartrand, Ping Zhang, 2013-05-20 Written by two prominent figures in the field this comprehensive text provides a remarkably student friendly approach Its sound yet accessible treatment emphasizes the history of graph theory and offers unique examples and lucid proofs 2004 edition **Discrete Mathematics with Ducks** sarah-marie belcastro, 2018-11-15 *Discrete Mathematics with Ducks* Second Edition is a gentle introduction for students who find the proofs and abstractions of mathematics challenging At the same time it provides stimulating material that instructors can use for more advanced students The first edition was widely well received with its whimsical writing style and numerous exercises and materials that engaged students at all levels The new expanded edition continues to facilitate effective and active learning It is designed to help students learn about discrete mathematics through problem based activities These are created to inspire students to understand mathematics by actively practicing and doing which helps students better retain what they've learned As such each chapter contains a mixture of discovery based activities projects expository text in class exercises and homework problems The author's lively and friendly writing style is appealing to both instructors and students alike and encourages readers to learn The book's light hearted approach to the subject is a guiding principle and helps students learn mathematical abstraction Features The book's Try This sections encourage students to construct components of discussed concepts theorems and proofs Provided sets of discovery problems and illustrative examples reinforce learning Bonus sections can be used by instructors as part of their regular curriculum for projects or for further study **Handbook of Discrete and Computational Geometry** Csaba D. Toth, Joseph O'Rourke, Jacob E. Goodman, 2017-11-22 The Handbook of

Discrete and Computational Geometry is intended as a reference book fully accessible to nonspecialists as well as specialists covering all major aspects of both fields The book offers the most important results and methods in discrete and computational geometry to those who use them in their work both in the academic world as researchers in mathematics and computer science and in the professional world as practitioners in fields as diverse as operations research molecular biology and robotics Discrete geometry has contributed significantly to the growth of discrete mathematics in recent years This has been fueled partly by the advent of powerful computers and by the recent explosion of activity in the relatively young field of computational geometry This synthesis between discrete and computational geometry lies at the heart of this Handbook A growing list of application fields includes combinatorial optimization computer aided design computer graphics crystallography data analysis error correcting codes geographic information systems motion planning operations research pattern recognition robotics solid modeling and tomography

Pearls of Discrete Mathematics Martin Erickson, 2009-09-16
 Methods Used to Solve Discrete Math Problems Interesting examples highlight the interdisciplinary nature of this area *Pearls of Discrete Mathematics* presents methods for solving counting problems and other types of problems that involve discrete structures Through intriguing examples problems theorems and proofs the book illustrates the relation

Graphs, Algorithms, and Optimization, Second Edition William Kocay, Donald L. Kreher, 2016-11-03 The second edition of this popular book presents the theory of graphs from an algorithmic viewpoint The authors present the graph theory in a rigorous but informal style and cover most of the main areas of graph theory The ideas of surface topology are presented from an intuitive point of view We have also included a discussion on linear programming that emphasizes problems in graph theory The text is suitable for students in computer science or mathematics programs

Handbook of Graph Theory, Second Edition Jonathan L. Gross, Jay Yellen, Ping Zhang, 2013-12-17 In the ten years since the publication of the best selling first edition more than 1 000 graph theory papers have been published each year Reflecting these advances *Handbook of Graph Theory Second Edition* provides comprehensive coverage of the main topics in pure and applied graph theory This second edition over 400 pages longer than its predecessor incorporates 14 new sections Each chapter includes lists of essential definitions and facts accompanied by examples tables remarks and in some cases conjectures and open problems A bibliography at the end of each chapter provides an extensive guide to the research literature and pointers to monographs In addition a glossary is included in each chapter as well as at the end of each section This edition also contains notes regarding terminology and notation With 34 new contributors this handbook is the most comprehensive single source guide to graph theory It emphasizes quick accessibility to topics for non experts and enables easy cross referencing among chapters

Introduction to Cryptography with Mathematical Foundations and Computer Implementations Alexander Stanoyevitch, 2010-08-09 From the exciting history of its development in ancient times to the present day *Introduction to Cryptography with Mathematical Foundations and Computer Implementations* provides a focused tour of the central

concepts of cryptography Rather than present an encyclopedic treatment of topics in cryptography it delineates cryptographic concepts in chronological order developing the mathematics as needed Written in an engaging yet rigorous style each chapter introduces important concepts with clear definitions and theorems Numerous examples explain key points while figures and tables help illustrate more difficult or subtle concepts Each chapter is punctuated with Exercises for the Reader complete solutions for these are included in an appendix Carefully crafted exercise sets are also provided at the end of each chapter and detailed solutions to most odd numbered exercises can be found in a designated appendix The computer implementation section at the end of every chapter guides students through the process of writing their own programs A supporting website provides an extensive set of sample programs as well as downloadable platform independent applet pages for some core programs and algorithms As the reliance on cryptography by business government and industry continues and new technologies for transferring data become available cryptography plays a permanent important role in day to day operations This self contained sophomore level text traces the evolution of the field from its origins through present day cryptosystems including public key cryptography and elliptic curve cryptography

Surveys in Combinatorics 2003 C. D. Wensley, 2003-07-24 The British Combinatorial Conference is held every two years and is a key event for mathematicians worldwide working in combinatorics In June 2003 the conference was held at the University of Wales Bangor The papers contained here are surveys contributed by the invited speakers and are of the high quality that befits the event There is also a tribute to Bill Tutte who had a long standing association with the BCC The papers cover topics currently attracting significant research interest as well as some less traditional areas such as the combinatorics of protecting digital content They will form an excellent resource for established researchers as well as graduate students who will find much here to inspire future work

Mathematical Biology Christina Alvey, Daniel Alvey, 2024-08-09 This text serves as an exploration of the beautiful topic of mathematical biology through the lens of discrete and differential equations Intended for students who have completed differential and integral calculus Mathematical Biology Discrete and Differential Equations allows students to explore topics such as bifurcation diagrams nullclines discrete dynamics and SIR models for disease spread which are often reserved for more advanced undergraduate or graduate courses These exciting topics are sprinkled throughout the book alongside the more typical first and second order linear differential equations and systems of linear differential equations This class tested text is written in a conversational welcoming voice which should help invite students along as they discover the magic of mathematical biology and both discrete and differential equations A focus is placed on examples with solutions written out step by step including computational steps with the goal of being as easy as possible for students to independently follow along Rich in applications this book can be used for a semester long course in either differential equations or mathematical biology Alternatively it can serve as a companion text for a two semester sequence beginning with discrete time systems extending through a wide array of topics in differential equations and culminating in systems SIR

models and other applications

Graph Searching Games and Probabilistic Methods Anthony Bonato, Pawel

Pralat, 2017-11-28 Graph Searching Games and Probabilistic Methods is the first book that focuses on the intersection of graph searching games and probabilistic methods. The book explores various applications of these powerful mathematical tools to games and processes such as Cops and Robbers, Zombie and Survivors, and Firefighting. Written in an engaging style, the book is accessible to a wide audience including mathematicians and computer scientists. Readers will find that the book provides state-of-the-art results, techniques, and directions in graph searching games, especially from the point of view of probabilistic methods. The authors describe three directions while providing numerous examples which include: Playing a deterministic game on a random board, Players making random moves, Probabilistic methods used to analyze a deterministic game.

Finite-Dimensional Linear Algebra Mark S. Gockenbach, 2011-06-15 Linear algebra forms the basis for much of modern mathematics: theoretical, applied, and computational. Finite Dimensional Linear Algebra provides a solid foundation for the study of advanced mathematics and discusses applications of linear algebra to such diverse areas as combinatorics, differential equations, optimization, and approximation. The author begins with an overview of the essential themes of the book: linear equations, best approximation, and diagonalization. He then takes students through an axiomatic development of vector spaces, linear operators, eigenvalues, norms, and inner products. In addition to discussing the special properties of symmetric matrices, he covers the Jordan canonical form, an important theoretical tool, and the singular value decomposition, a powerful tool for computation. The final chapters present introductions to numerical linear algebra and analysis in vector spaces, including a brief introduction to functional analysis in infinite dimensional linear algebra. Drawing on material from the author's own course, this textbook gives students a strong theoretical understanding of linear algebra. It offers many illustrations of how linear algebra is used throughout mathematics.

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Irregularity in Graphs Akbar Ali, Gary Chartrand, Ping Zhang, 2021-05-20 Die Theorie der regulären Graphen. The Theory of Regular Graphs, written by the Danish Mathematician Julius Petersen in 1891, is often considered the first strictly theoretical paper dealing with graphs. In the 130 years since then, regular graphs have been a common and popular area of study. While regular graphs are typically considered to be graphs whose vertices all have the same degree, a more general interpretation is that of graphs possessing

some common characteristic throughout their structure During the past several decades however there has been some increased interest in investigating graphs possessing a property that is in a sense opposite to regularity It is this topic with which this book deals giving rise to a study of what might be called irregularity in graphs Here various irregularity concepts dealing with several topics in graph theory are described such as degrees of vertices graph labelings weightings colorings graph structures Eulerian and Hamiltonian properties graph decompositions and Ramsey type problems

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