Mathematical Induction Problems And Solutions

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Lectures, Problems and Solutions for Ordinary Differential Equations  Deng Yuefan 2017-08-11 This unique book on ordinary differential equations addresses practical issues of composing and solving differential equations by demonstrating the detailed solutions of more than 1,000 examples. The initial draft was used to teach more than 10,000 advanced undergraduate students in engineering, physics, economics, as well as applied mathematics. It is a good source for students to learn problem-solving skills and for educators to find problems for homework assignments and tests. The 2nd edition, with at least 100 more examples and five added subsections, has been restructured to flow more pedagogically.

Matrix-Based Multigrid Yair Shapira 2013-04-17 Many important problems in applied science and engineering, such as the Navier Stokes equations in fluid dynamics, the primitive equations in global climate mod eling, the strain-stress equations in mechanics, the neuron diffusion equations in nuclear engineering, and MRI/CT medical simulations, involve complicated sys tems of nonlinear partial differential equations. When discretized, such problems produce extremely large, nonlinear systems of equations, whose numerical solution is prohibitively costly in terms of time and storage. High-performance (parallel) computers and efficient (parallelizable) algorithms are clearly necessary. Three classical approaches to the solution of such systems are: Newton's method, Preconditioned Conjugate Gradients (and related Krylov-space acceleration tech niques), and multigrid methods. The first two approaches require the solution of large sparse linear systems at every iteration, which are themselves often solved by multigrid methods. Developing robust and efficient multigrid algorithms is thus of great importance. The original multigrid algorithm was developed for the Poisson equation in a square, discretized by finite differences on a uniform grid. For this model problem, multigrid exhibits extremely rapid convergence, and actually solves the problem in the minimal possible time. The original algorithm uses rediscritization of the partial differential equation (POE) on each grid in the hierarchy of coarse grids that are used. However, this approach would not work for more complicated problems, such as problems on complicated domains and nonuniform grids, problems with variable coefficients, and non symmetric and indefinite equations. In these cases, matrix-based multigrid methods are in order.


Oswaal NCERT Exemplar Problem-Solutions, Class 11 (4 Book Sets) Physics, Chemistry, Mathematics, Biology (For Exam 2021) Oswaal Editorial Board 2021-03-22 Chapter wise & Topic wise presentation for ease of learning Quick Review for in depth study Mind maps for clarity of concepts All MCQs with explanation against the correct option Some important questions developed by ‘Oswaal Panel’ of experts Previous Year’s Questions Fully Solved Complete Latest NCERT Textbook & Intext Questions Fully Solved Quick Response (QR Codes) for Quick Revision on your Mobile Phones / Tablets Expert Advice how to score more suggestion and ideas shared

Handbook of Mathematical Induction David S. Gunderson 2014-01-09 Handbook of Mathematical Induction: Theory and Applications shows how to find and write proofs via mathematical induction. This comprehensive book covers the theory, the structure of the written proof, all standard exercises, and hundreds of application examples from nearly every area of mathematics.In the first part of the book, the author discusses

The Induction Book Steven H. Weintraub 2017-05-03 Mathematical induction — along with its equivalents, complete induction and well-ordering, and its immediate consequence, the pigeonhole principle — constitute essential proof techniques. Every mathematician is familiar with mathematical induction, and every student of mathematics requires a grasp of its concepts. This volume provides an introduction and a thorough exposure to these proof techniques. Geared toward students of mathematics at all levels, the text is particularly suitable for courses in mathematical induction, theorem-proving, and problem-solving. The treatment begins with both intuitive and formal explanations of mathematical induction and its equivalents. The next chapter presents many problems consisting of results to be proved by induction, with solutions omitted to enable instructors to assign them to students. Problems vary in difficulty; the majority of them require little background, and the most advanced involve calculus or linear algebra. The final chapter features proofs too complicated for students to find on their own, some of which are famous theorems by well-known mathematicians. For these beautiful and important theorems, the author provides expositions and proofs. The text concludes with a helpful Appendix providing the logical equivalence of the various forms of induction.

Andhra Pradesh EAMCET Chapterwise Solutions 2020-2018 Mathematics for 2021 Exam Arihant Experts 2021-03-25 1. EAMCET Chapterwise Solutions 2020-2018 – Mathematics 2. The book divided into 29 Chapters 3. Each chapter is provided with the sufficient number of previous question 4. 3 Practice Sets given to know the preparation levels The Andhra Pradesh State Council of Higher Education (APSCHE) has announced the admissions in Andhra Pradesh Engineering Agricultural and Medical Common Entrance Test (AP EAMCET). Students are required proper preparation and practice of the syllabus in order to get admissions in the best colleges of the state. In order to ease the preparation of the exam, Arihant introduces the new edition “Andhra Pradesh EAMCET Chapterwise Solutions 2020-2018 – Mathematics” this book is designed to provide the suitable study and practice material as per the exam pattern. The entire syllabus has been divided into 29 chapters of the subject. Each chapter is provided with the sufficient number of previous question from 2018 to 2020. Lastly, there are 3 Practice Sets giving a finishing touch to the knowledge that has been acquired. TOC Complex Numbers and De-Moiver’s Theorems, Quadratic Equations, Theory of Equations, Functions, Mathematical Inductions, Partial Fractions, Binomial Theorems, Permutations and Combinations, Matrices and Determinants, Measures of Dispensions, Probability, Trigonometry Functions and Identities, Trigonometry Equations, Properties of Triangles, Inverse Trigonometric Functions, Hyperbolic Functions, Rectangular Cartesian Coordinates, Straight Line and Pair of Straight Lines, Circle and System of Circles, Conic Sections, Vector Algebra, Three Dimensional Geometry, Limits and Continuity, Differentiation, Applications of Derivatives, Indefinite Integral and Its Applications, Differential Equations, Miscellaneous, Practice Sets (1-3).

Resources for Teaching Discrete Mathematics Brian Hopkins 2009 Resources for Teaching Discrete Mathematics presents nineteen classroom tested projects complete with student handouts, solutions, and notes to the instructor. Topics range from a first day activity that motivates proofs to applications of discrete mathematics to chemistry, biology, and data storage. Other projects provide: supplementary material on classic topics such as the towers of Hanoi and the Josephus problem, how to use a calculator to explore various course topics, how to employ Cuisenaire rods to examine the Fibonacci numbers and other sequences, and how you can use plastic pipes to create a geodesic dome. The book contains eleven history modules that allow students to explore topics in
their original context. Sources range from eleventh century Chinese figures that prompted Leibniz to write on binary arithmetic, to a 1959 article on automata theory. Excerpts include: Pascal’s ”Treatise on the Arithmetical Triangle,” Hamilton’s “Account of the Icosian Game,” and Cantor’s (translated) “Contributions to the Founding of the Theory of Transfinite Numbers.” Five articles complete the book. Three address extensions of standard discrete mathematics content: an exploration of historical counting problems with attention to discovering formulas, a discussion of how computers store graphs, and a survey connecting the principle of inclusion-exclusion to Möbius inversion. Finally, there are two articles on pedagogy specifically related to discrete mathematics courses: a summary of adapting a group discovery method to larger classes, and a discussion of using logic in encouraging students to construct proofs.


Mathematical Olympiad In China (2009-2010): Problems And Solutions Xiong Bin 2013-02-20 The International Mathematical Olympiad (IMO) is a competition for high school students. China has taken part in the IMO 21 times since 1985 and has won the top ranking for countries 14 times, with a multitude of golds for individual students. The six students China has sent every year were selected from 20 to 30 students among approximately 130 students who took part in the annual China Mathematical Competition during the winter months. This volume of comprises a collection of original problems with solutions that China used to train their Olympiad team in the years from 2009 to 2010. Mathematical Olympiad problems with solutions for the years 2002-2008 appear in an earlier volume, Mathematical Olympiad in China.

A Decade of the Berkeley Math Circle Zvezdelina Stankova 2008-11-26 Many mathematicians have been drawn to mathematics through their experience with math circles: extracurricular programs exposing teenage students to advanced mathematical topics and a myriad of problem solving techniques and inspiring in them a lifelong love for mathematics. Founded in 1998, the Berkeley Math Circle (BMC) is a pioneering model of a U.S. math circle, aspiring to prepare our best young minds for their future roles as mathematicians leaders. Over the last decade, 50 instructors—from university professors to high school teachers to business tycoons—have shared their passion for mathematics by delivering more than 320 BMC sessions full of mathematical challenges and wonders. Based on a dozen of these sessions, this book encompasses a wide variety of enticing mathematical topics: from inversion in the plane to circle geometry; from combinatorics to Rubik’s cube and abstract algebra; from number theory to mass point geometry; from complex numbers to game theory via invariants and monovariants. The treatments of these subjects encompass every significant method of proof and emphasize ways of thinking and reasoning via 100 problem solving techniques. Also featured are 300 problems, ranging from beginner to intermediate level, with occasional peaks of advanced problems and even some open questions. The book presents possible paths to studying mathematics and inevitably falling in love with it, via teaching two important skills: thinking creatively while still “obeying the rules,” and making connections between problems, ideas, and theories. The book encourages you to apply the newly acquired knowledge to problems and games you also enjoy, and rarely gives you ready answers: “Learning from our own mistakes” often occurs through discussions of non-proofs and common problem solving pitfalls. The reader has to commit to mastering the new theories and techniques by “getting your hands dirty” with the problems, going back and reviewing necessary problem solving techniques and theory, and persistently moving forward in the book. The mathematical world is huge: you’ll never know everything, but you’ll learn where to find things, how to connect and use them. The rewards will be substantial. In the interest of fostering a greater awareness and appreciation of mathematics and its connections to other disciplines and everyday life, MSRI and the AMS are publishing books in the Mathematical Circles Library series as a service to young people, their parents and teachers, and the mathematics profession.

Handbook of Mathematical Induction David S. Gunderson 2016-11-16 Handbook of Mathematical Induction: Theory and Applications shows how to find and write proofs via mathematical induction. This comprehensive book covers the theory, the structure of the written proof, all standard exercises, and hundreds of application examples from nearly every area of mathematics. In the first part of the book, the author discusses different inductive techniques, including well-ordered sets, basic mathematical induction, strong induction, double induction, infinite descent, downward induction, and several variants. He then introduces ordinals and cardinals, transfinite induction, the axiom of choice, Zorn’s lemma, empirical induction, and fallacies and induction. He also explains how to write inductive proofs. The next part contains more than 750 exercises that highlight the levels of difficulty of an inductive proof, the variety of inductive techniques available, and the scope of results provable by mathematical induction. Each self-contained chapter in this section includes the necessary definitions, theory, and notation and covers a range of theorems and problems, from fundamental to very specialized. The final part presents either solutions or hints to the exercises. Slightly longer than what is found in most texts, these solutions provide complete details for every step of the problem-solving process.

Induction in Geometry L.I. Golovina 2019-10-16 Induction in Geometry discusses the application of the method of mathematical induction to the solution of geometric problems, some of which are quite intricate. The book contains 37 examples with detailed solutions and 40 for which only brief hints are provided. Most of the material requires only a background in high school algebra and plane geometry; chapter six assumes some knowledge of solid geometry, and the text occasionally employs formulas from trigonometry. Chapter seven is self-contained and attempts to present those for which they are unprepared. To provide additional background, this volume incorporates the concise text, The Method of Mathematical Induction. This approach introduces this technique of mathematical proof via many examples from algebra, geometry, and trigonometry, and in greater detail than standard texts. A background in high school algebra will largely suffice; later problems require some knowledge of trigonometry. The combination of solved problems within the text and those left for readers to work on, with solutions provided at the end, makes this volume especially practical for independent study.

Book of Proof Richard H. Hammack 2016-01-01 This book is an introduction to the language and standard proof methods of mathematics. It is a bridge from the computational courses (such as calculus or differential equations) that students typically encounter in their first year of college to a more abstract outlook. It lays a foundation for more theoretical courses such as topology, analysis and abstract algebra. Although it may be more meaningful to the student who has had some calculus, there is really no prerequisite other than a measure of mathematical maturity.

The Nature of Mathematical Knowledge San Diego Philip Kitcher Professor of Philosophy University of California 1983-04-21 This book argues against the view that mathematical knowledge is a priori, contending that mathematics is an empirical science and develops historically, just as natural sciences do. Kitcher presents a complete, systematic, and richly detailed account of the nature of mathematical knowledge and its historical development, focusing on such neglected issues as how and why mathematical language changes, why certain questions assume overriding importance, and how standards of proof are modified.

EAMCET Mathematics Andhra and Telangana Chapterwise 28 Years’ Solutions and 5 Mock Tests 2020 Arihant Experts 2019-11-12 Engineering Agricultural & Medical Common Entrance Test (EAMCET) is an entrance examination conducted by the Jawaharlal Nehru Technological University annually for getting admission in some of the engineering, agricultural and medical colleges in the states of Andhra Pradesh and Telangana. In order to ease the preparation of EAMCET, this book provides suitable study & practice material and a revisionary aid for Mathematics subject that gives the insight of the pattern of the exam. It familiarizes with the structural formation of the paper by giving the complete coverage of Previous Years’ Questions in a Chapterwise format. Solutions provided in a lucid manner that helps students to understand the difficulty level and trends of the Questions. Moreover, all the online questions papers of 2019 & 2018 are covered in this book whereas free 5 Online Mock Tests are provided for practice to give the exact feel of this examination that candidates more rehearsed and confidence for the real exam. TABLE OF CONTENT AP EAMCET Solved Paper 2019, TS EAMCET Solved Paper 2019, AP EMACET Solved Paper 2018, TS EAMCET Solved Paper 2018, EAMCET...
A Mathematical Orchard
Mark I. Krusemeyer 2012-10-11 Here is a collection of 208 challenging, original problems, with carefully worked, detailed solutions. In addition to problems from The WoHoscope County Problem Book, there are about 80 new problems, many of which involve experimentation and pattern finding. The problems are intended for undergraduates; although some knowledge of linear or abstract algebra is needed for a few of the problems, most require nothing beyond calculus. In fact, many of the problems should be accessible to high school students. On the other hand, some of the problems require considerable mathematical maturity, and most students will find few of the problems routine. Over four-fifths of the book is devoted to presenting instructive, clear, and often elegant solutions. For many problems, multiple solutions are given. Appendices list the prerequisites for individual problems and arrange them by topic. This should be helpful to classes on problem solving and to individuals or teams preparing for contests such as the Putnam. The index can help, as well, in finding problems with a specific theme, or in recovering a half-remembered problem.

Challenging Mathematical Problems with Elementary Solutions ?.
George Polya 2013-04-09 Based on Stanford University's well-known competitive exam, this excellent mathematics workbook offers students at both high school and college levels a complete set of problems, hints, and solutions. 1974 edition.

Algorithms Sequential & Parallel: A Unified Approach
Russ Miller 2012-12-20 Equip yourself for success with a state-of-the-art approach to algorithms available only in Miller/Boxer's ALGORITHMS SEQUENTIAL AND PARALLEL: A UNIFIED APPROACH, 3E. This unique and functional text gives you an introduction to algorithms and paradigms for modern computing systems, integrating the study of parallel and sequential algorithms within a focused presentation. With a wide range of practical exercises and engaging examples drawn from fundamental application domains, this book prepares you to design, analyze, and implement algorithms for modern computing systems. Important Notice: Media content referenced within the product description or the product text may not be available in the eBook version.

Mathematical Olympiad in China
Oswaal NCERT Exemplar (Problems - solutions) Class 12 Mathematics (For 2022 Exam) Oswaal Editorial Board 2022-03-03 Chapter-wise & Topic-wise presentation • Chapter Objectives-A sneak peek into the chapter • Mind Map: A single page snapshot of the entire chapter • Quick Review: Concept-based study material • Tips & Tricks: Useful guidelines for attempting each question perfectly • Some Commonly Made Errors: Most common and unidentified errors made by students discussed • Expert Advice- Oswaal Expert Advice on how to score more! • Oswaal QR Codes-For Quick Revision on your Mobile Phones & Tablets We hope that Oswaal NCERT Solutions will help you at every step as you move closer to your educational goals.

The Art and Craft of Problem Solving
Paul Zeitz 2016-12-01 Appealing to everyone from college-level majors to independent learners, The Art and Craft of Problem Solving, 3rd Edition introduces a problem-solving approach to mathematics, as opposed to the traditional exercises approach. The goal of The Art and Craft of Problem Solving is to develop strong problem solving skills, which it achieves by encouraging students to do math rather than just study it. Paul Zeitz draws upon his experience as a coach for the international mathematics Olympiad to give students an enhanced sense of mathematics and the ability to investigate and solve problems.

Studies Concerning Minimal Time Solutions to the Firing Squad
Synchronization Problem Robert M. Balzer 1966 This paper presents a description of a general outline for a minimal time solution to the firing squad synchronization problem, and a solution of this form which is composed of machines with only eight states. The paper then discusses the verification of this minimal time solution by computer simulation, and gives a mathematical induction proof that the solution works for any length. The paper then discusses some efforts to determine the minimal number of states needed for a minimal time solution. No four state minimal time solution exists. A reasonable set of conditions are presented for which no five state minimal time solution exists. The final part of the paper demonstrates the equivalence of one-dimensional iterative arrays and turing machines, and shows how the techniques used here apply to problems of optimizing turing machines for a given computation. (Author).

Handbook of Mathematical Induction David S. Gunderson 2010-09-14 Handbook of Mathematical Induction: Theory and Applications shows how to find and write proofs via mathematical induction. This comprehensive book covers the theory, the structure of the written proof, all standard exercises, and hundreds of application examples from nearly every area of mathematics. In the first part of the book, the author discusses different inductive techniques, including well-ordered sets, basic mathematical induction, strong induction, double induction, infinite descent, downward induction, and several variants. He then introduces ordinals and cardinals, transfinite induction, the axiom of choice, Zorn’s lemma, empirical induction, and fallacies and induction. He also explains how to write inductive proofs. The next part contains more than 750 exercises that highlight the levels of difficulty of an inductive proof, the variety of inductive techniques available, and the scope of results provable by mathematical induction. Each self-contained chapter in this section includes the necessary definitions, theory, and notation and covers a range of theorems and problems, from fundamental to very specialized. The final part presents either solutions or hints to the exercises. Slightly longer than what is found in most texts, these solutions provide complete details for every step of the problem-solving process.

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Discrete Mathematics: Introduction to Mathematical Reasoning Susanna S. Epp 2014-07-18 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.

Discrete Mathematics Oscar Levin 2018-12-31 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.

Mathematics as Problem Solving Alexander Soifer 2009-04-29 Various elementary techniques for solving problems in algebra, geometry, and combinatorics are explored in this second edition of Mathematics as Problem Solving. Each new chapter builds on the previous one, allowing the reader to uncover new methods for using logic to solve problems. Topics are presented in self-contained chapters, with classical solutions as well as Soifer’s own discoveries. With roughly 200 different problems, the reader is challenged to solve over 150 problems and 50 theorems to prove. Mathematics as Problem Solving is aimed at students from high school through undergraduate levels and beyond, educators, and the general reader interested in the methods of mathematical problem solving.


Mathematical Reasoning Ted Sundstrom 2014-06-11 Mathematical Reasoning: Writing and Proof is a text for the first college mathematics course that introduces students to the processes of constructing and writing proofs and focuses on the formal development of mathematics. The primary goals of the text are to help students: Develop logical thinking skills and to develop the ability to think more abstractly in a proof oriented setting; develop the ability to construct and write mathematical proofs using standard methods of mathematical proof including direct proofs, proof by contradiction, mathematical induction, case analysis, and counterexamples; develop the ability to read and understand written mathematical proofs; develop talents for creative thinking and problem solving; improve their quality of communication in mathematics. This includes improving writing techniques, reading comprehension, and oral communication in mathematics; better understand the nature of mathematics and its language. Another important goal of this text is to provide students with material that will be needed for their further study of mathematics. Important features of the book include: Emphasis on writing in mathematics; instruction in the process of constructing proofs; emphasis on active learning.There are no changes in content between Version 2.0 and previous versions of the book. The only change is that the appendix with answers and hints for selected exercises now contains solutions and hints for more exercises.

The Nuts and Bolts of Proofs Antonella Cupillari 2001 This book leads readers through a progressive explanation of what mathematical proofs are, why they are important, and how they work, along with a presentation of basic techniques used to construct proofs. The Second Edition presents more examples, more exercises, a more complete treatment of mathematical induction and set theory, and it incorporates suggestions from students and colleagues. Since the mathematical concepts used are relatively elementary, the book can be used as a supplement in any post-calculus course. This title has been successfully class-tested for years. There is an index for easier reference, a more extensive list of definitions and concepts, and an updated bibliography. An extensive collection of exercises with complete answers are provided, enabling students to practice on their own. Additionally, there is a set of
problems without solutions to make it easier for instructors to prepare homework assignments. * Successfully class-tested over a number of years * Index for easy reference * Extensive list of definitions and concepts * Updated bibliography

**Telangana EAMCET Chapterwise Solutions 2020-2018**
Mathematics for 2021 Exam Arihant Experts 2021-03-25 1. EAMCET Chapterwise Solutions 2020-2018 – Mathematics 2. The book divided into 29 Chapters 3. Each chapter is provided with the sufficient number of previous question 4. 3 Practice Sets given to know the preparation levels
The Telangana State Council of Higher Education has announced the admissions in Andhra Pradesh Engineering Agricultural and Medical Common Entrance Test (Telangana EAMCET). Students are required proper preparation and practice of the syllabus in order to get admissions in the best colleges of the state. In order to ease the preparation of the exam, Arihant introduces the new edition “Telangana EAMCET Chapterwise Solutions 2020-2018 – Mathematics” this book is designed to provide the suitable study and practice material aid as per the exam pattern. The entire syllabus has been divided into 29 chapters of the subject. Each chapter is provided with the sufficient number of previous question from 2018 to 2020. Lastly, there are 3 Practice Sets & 3 Free Online Practice Sets giving a finishing touch to the knowledge that has been acquired. TOC Complex Numbers and De-Moiver’s Theorems, Quadratic Equations, Theory of Equations, Functions, Mathematical Inductions, Partial Fractions, Binomial Theorems, Permutations and Combinations, Matrices and Determinants, Measures of Dispersions, Probability, Trigonometry Functions and Identities, Trigonometry Equations, Properties of Triangles, Inverse Trigonometric Functions, Hyperbolic Functions, Rectangular Cartesian Coordinates, Straight Line and Pair of Straight Lines, Circle and System of Circles, Conic Sections, Vector Algebra, Three Dimensional Geometry, Limits and Continuity, Differentiation, Applications of Derivatives, Indefinite Integral and Its Applications, Differential Equations, Miscellaneous, Practice Sets (1-3).

**A Spiral Workbook for Discrete Mathematics** Harris Kwong 2015-11-06 A Spiral Workbook for Discrete Mathematics covers the standard topics in a sophomore-level course in discrete mathematics: logic, sets, proof techniques, basic number theory, functions, relations, and elementary combinatorics, with an emphasis on motivation. The text explains and clarifies the unwritten conventions in mathematics, and guides the students through a detailed discussion on how a proof is revised from its draft to a polished form. Hands-on exercises help students understand a concept soon after learning it. The text adopts a spiral approach: many topics are revisited multiple times, sometimes from a different perspective or at a higher level of complexity, in order to slowly develop the student’s problem-solving and writing skills.