

## Problem Solving Through Recreational Mathematics Dover Books On Mathematics By Averbach Bonnie Chein Orin Mathematics 1999 Paperback

"The author believes in the presentation and teaching of mathematics as recreation. When the Rubik's Cube took off in 1978, based on thinly disguised mathematics, he became seriously interested in mathematical puzzles which would provide mental stimulation for students and professional mathematicians. In these 2-volume books, the readers shall have an adventure into previously unknown origins of ancient puzzles, which could be traced back to their Medieval, Chinese, Arabic and Indian sources. The puzzles are fully described, many with illustrations, adding interest to their history and relevance to contemporary mathematical concepts"--

This long-awaited sequel of *Mathematical Quickies & Trickies* comes with many creative worked examples and questions, with cartoons sprinkled throughout the book to keep in line with the same irreverent and fun spirit of the previous book. In addition to 300+ trick and tricky questions, *More Mathematical Quickies & Trickies* comes with more than 25 five-minute enrichment mathematics items, aimed at enhancing the mathematical problem-solving skills of problem solvers. You won't only be exposed to different problem-solving techniques, commonly used in answering math contests and competitions questions, but also learn to appreciate elegant or intuitive solutions. *More Mathematical Quickies & Trickies* would appeal primarily to these audiences: \* grades 6-8 students and teachers looking for some fertile trick and tricky questions; \* mathletes preparing for local and regional contests and competitions; \* problem solvers longing to be challenged by questions whose obvious solutions are never the correct ones for what offhand appears to be true is false. Contents 1. Creative GST 2. Are You Calculator-Smart? 3. What Is the Easy Way? 4. The Magic of Three Consecutive Numbers 5. Twitter Math @MathPlus 6. What Is  $27 \times 37$ , Really? 7. Humanizing 1, 2, 3 8. A Mathophobia Kit 9. WITs: 13 Ways to Attain Mathematical Excellence 10. Facebook Math: Numeracy vs. Literacy 11. Thou Shalt Not Divide By Zero 12. Math Jokes to Relieve Stress 13. Look-see Proofs 14. Some PhD Math Questions 15. Mathematical Prayers 16. The Largest Product 17. What's Wrong?: A Comedy of Mathematical Errors 18. The Aha! Myth 19. Sam Loyd's Toughies 20. The Tuesday Boy Problem 21. What Is  $1 + 1$ , Really? 22. In Love with Cryptarithms 23. Mathematical Kiasuism 24. The Mathemagic of 142857 25. The Lighter Side of Singapore Math 26. K C Yan's Laws & Loes 27 Flee and Free from the FREE Answers/Hints/Solutions Bibliography & References

Contains open-ended problems designed to foster positive feelings about mathematics, introduce students to the world of recreational mathematics, and sharpen problem-solving skills.

This book looks at classic puzzles from the perspective of their structures and what they tell us about the brain. It uses the work on the neuroscience of mathematics from Dehaene, Butterworth, Lakoff, Núñez, and many others as a lens to understand the ways in which puzzles reflect imaginative processes blended with rational ones. The book is not about recreational or puzzle-based mathematics in and of itself but rather about what the classic puzzles tell us about the mathematical imagination and its impact on the discipline. It delves into the history of classic math puzzles, deconstructing their *raison d'être* and describing their psychological features, so that their nature can be fleshed out in order to help understand the mathematical mind. This volume is the first monographic treatment of the psychological nature of puzzles in mathematics. With its user-friendly technical level of discussion, it is of interest to both general readers and those who engage in the disciplines of mathematics, psychology, neuroscience, and/or anthropology. It is also ideal as a textbook source for courses in recreational mathematics, or as reference material in introductory college math courses.

Singapore's bestselling *Mathematical Quickies & Trickies*, which has sold over 90,000 copies locally, contains more than 300 nonroutine problems to enhance students' mathematical problem-solving skills. With many creative worked examples and questions, and with cartoons sprinkled throughout the book, *Mathematical Quickies & Trickies* would appeal primarily to these audiences: \* grades 5-7 students and teachers looking for some fertile trick and tricky questions; \* mathletes preparing for local and regional contests and competitions; \* problem solvers longing to be challenged by questions whose obvious solutions are never the correct ones for what offhand appears to be true is false. With proper insight, you'll learn how to solve these tricky problems almost instantly, whose solutions are almost never the correct ones. You need no longer be caught off-guard; instead, you'll learn to solve these questions confidently—how to tame these counter-intuitive questions into routine ones. Contents 1. Mental Computation I 2. Mental Computation 2 3. Number Series 4. A Tricky Way with Fractions 5. Test Your Calculator Proficiency 6. Simplifying a Complex Fraction 7. Recurring Decimals 8. Is Zero an Even or Odd Integer? 9. Casting Out Nines 10. Be a Calculator Expert 11. Division by 9 12. Number Riddles 13. Ten Steps to be Math Smart 14. Shortcuts a la Trachtenberg 15. Geometrical Quickies 1 16. Geometrical Quickies 2 17. Geometrical Quickies 3 18. (Sugar + Coffee) + Milk = Sugar + (Coffee + Milk) 19. Applications of Number Laws 20. Law of One 21. Distributive Law 22. More Applications of Distributive Law 23. The Joy of Guesstimation 24. Are You a Fermi Disciple? 25. Bravo Singapore 26. Lightning Calculators 27. Geometrical Quickies 4 28. Some Calculator Quickies Answers & Solutions Bibliography & References Type of e-book: Nonfiction, problem solving, recreational, Singapore math, trick questions Audiences: Suitable for Grades 4-7 (or Primary 4-7 levels)

A compendium of over 5,000 problems with subject, keyword, author and citation indexes.

Basic mathematical principles are explained and problem-solving skills developed through a series of exercises, puzzles, and games Fascinating approach to mathematical teaching stresses use of recreational problems, puzzles, and games to teach critical thinking. Logic, number and graph theory, games of strategy, much more. Includes answers to selected problems. Free solutions manual available for download at the Dover website.

Publisher Fact Sheet Recalling Stephen Pinker's *The Language Instinct*, the author argues that humans are born with an "instinct for puzzles" that betrays a larger search for the meaning of life. This "instinct" has led to discoveries in mathematics and science, as well as revolutions in philosophical thought.

This entertaining book presents a collection of 180 famous mathematical puzzles and intriguing elementary problems that great mathematicians have posed, discussed, and/or solved. The selected problems do not require advanced mathematics, making this book accessible to a variety of readers. Mathematical recreations offer a rich playground for both amateur and professional mathematicians. Believing that creative stimuli and aesthetic considerations are closely related, great mathematicians from ancient times to the present have always taken an interest in puzzles and diversions. The goal of this book is to show that famous mathematicians have all communicated brilliant ideas, methodological approaches, and absolute genius in mathematical thoughts by using recreational mathematics as a framework. Concise biographies of many mathematicians mentioned in the text are also included. The majority of the mathematical problems presented in this book originated in number theory, graph theory, optimization, and probability. Others are based on combinatorial and chess problems, while still others are geometrical and arithmetical puzzles. This book is intended to be both entertaining as well as an introduction to various intriguing mathematical topics and ideas. Certainly, many stories and famous puzzles can be very useful to prepare classroom lectures, to inspire and amuse students, and to instill affection for mathematics.

David Singmaster believes in the presentation and teaching of mathematics as recreation. When the Rubik's Cube took off in 1978, based on thinly disguised mathematics, he became seriously interested in mathematical puzzles which would provide



book, but also others encountered in interviews, puzzle collections, and throughout everyday life. Each of the 150 puzzles contains hints and solutions, along with commentary on the puzzle's origins and solution methods. The only book of its kind, *Algorithmic Puzzles* houses puzzles for all skill levels. Readers with only middle school mathematics will develop their algorithmic problem-solving skills through puzzles at the elementary level, while seasoned puzzle solvers will enjoy the challenge of thinking through more difficult puzzles.

Any high school student preparing for the American Mathematics Competitions should get their hands on a copy of this book! A major aspect of mathematical training and its benefit to society is the ability to use logic to solve problems. The American Mathematics Competitions (AMC) have been given for more than fifty years to millions of high school students. This book considers the basic ideas behind the solutions to the majority of these problems, and presents examples and exercises from past exams to illustrate the concepts. Anyone taking the AMC exams or helping students prepare for them will find many useful ideas here. But people generally interested in logical problem solving should also find the problems and their solutions interesting. This book will promote interest in mathematics by providing students with the tools to attack problems that occur on mathematical problem-solving exams, and specifically to level the playing field for those who do not have access to the enrichment programs that are common at the top academic high schools. The book can be used either for self-study or to give people who want to help students prepare for mathematics exams easy access to topic-oriented material and samples of problems based on that material. This is useful for teachers who want to hold special sessions for students, but it is equally valuable for parents who have children with mathematical interest and ability. As students' problem solving abilities improve, they will be able to comprehend more difficult concepts requiring greater mathematical ingenuity. They will be taking their first steps towards becoming math Olympians!

Ranging from ancient Greek and Roman problems to the most modern applications of special mathematical techniques for amusement, this popular volume contains material to delight both beginners and advanced mathematicians. Its 250 lively puzzles, problems, situations, and demonstrations of recreational mathematics feature full solutions and analyses. Fifty-seven highly unusual historic problems are derived from ancient Greek, medieval European, Arabic, and Hindu sources. Other problems are based on "mathematics without numbers," geometry, topology, the calendar, arithmetic, and the mathematics of chess moves. Fifty pages comprise numerical pastimes built out of figurate numbers, Mersenne numbers, Fermat numbers, cyclic numbers, automorphic numbers, and prime numbers; probability problems are also fully analyzed. More than forty pages are devoted to magic squares, and the concluding portion of the book presents more than twenty-five new positional and permutational games of permanent value. A discussion of fairy chess is followed by rules and procedural information on latruncles, go, reversi, jinx, ruma, lasca, tricolor, four-story towers, tetrachrome, and other games. More than a collection of wonderful puzzles, this volume offers a thorough, rigorous, and entertaining sampler of recreational mathematics, highlighted by numerous insights into specialized fields.

This book is the outgrowth of a NATO Advanced Research Workshop, held in Milton Keynes (United Kingdom) in the summer of 1990. The workshop brought together about 30 world leaders in the use of advanced technologies in the teaching of mathematics and science. Many of these participants commented that the workshop was one of the more productive and exciting workshops that they had attended. It was not uncommon to see participants engaged in informal discussion far into the evenings and early mornings, long after formal sessions had ended. It is my hope that this book captures the substance and excitement of many of the ideas that were presented at the workshop. Indeed, the process by which this book has come about has given every opportunity for the best thinking to get reflected here. Participants wrote papers prior to the workshop. After the workshop, participants revised the papers at least once. In a few instances, three versions of papers were written. Some participants could not resist the urge to incorporate descriptions of some of the newer developments in their projects. The papers in this book demonstrate how technology is impacting our view of what should be taught, what can be taught, and how we should go about teaching in the various disciplines. As such, they offer great insight into the central issues of teaching and learning in a wide range of disciplines and across many grade levels (ranging from elementary school through undergraduate college education).

Problem solving consists of using generic or ad hoc methods, in an orderly manner, for finding solutions to problems. Some of the problem-solving techniques developed and used in artificial intelligence, computer science, engineering, mathematics, medicine, etc. are related to mental problem-solving techniques studied in psychology. The term problem-solving is used in many disciplines, sometimes with different perspectives, and often with different terminologies. For instance, it is a mental process in psychology and a computerized process in computer science. Problems can also be classified into two different types (ill-defined and well-defined) from which appropriate solutions are to be made. Ill-defined problems are those that do not have clear goals, solution paths, or expected solution. Well-defined problems have specific goals, clearly defined solution paths, and clear expected solutions. These problems also allow for more initial planning than ill-defined problems. Being able to solve problems sometimes involves dealing with pragmatics (logic) and semantics (interpretation of the problem). The ability to understand what the goal of the problem is and what rules could be applied represent the key to solving the problem. Sometimes the problem requires some abstract thinking and coming up with a creative solution.

Now in its fifth edition, *A Mathematics Sampler* presents mathematics as both science and art, focusing on the historical role of mathematics in our culture. It uses selected topics from modern mathematics—including computers, perfect numbers, and four-dimensional geometry—to exemplify the distinctive features of mathematics as an intellectual endeavor, a problem-solving tool, and a way of thinking about the rapidly changing world in which we live. *A Mathematics Sampler* also includes unique LINK sections throughout the book, each of which connects mathematical concepts with areas of interest throughout the humanities. The original course on which this text is based was cited as an innovative approach to liberal arts mathematics in Lynne Cheney's report, "50 HOURS: A Core Curriculum for College Students",

