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

Praised for its "exceptionally good value" by the Journal of Recreational Mathematics, this book offers fun-filled insights into many fields of mathematics. The brainteasers include original puzzles as well as new approaches to classic conundrums. A vast assortment of challenges features domino puzzles, the game of noughts and crosses, games of encirclement, sliding movement puzzles, subtraction games, puzzles in mechanics, games with piles of matches, a road puzzle with concentric circles, "Catch the Giant," and much more. Detailed solutions show several methods by which a particular problem may be answered, why one method is preferable, and where the others fail. With numerous worked examples, the clear, step-by-step analyses cover how the problem should be approached, including hints and enumeration of possibilities and determination of probabilities, application of the theory of probability, and evaluation of contingencies and mean values. Readers are certain to improve their puzzle-solving strategies as well as their mathematical skills.

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.

Number theory proves to be a virtually inexhaustible source of intriguing puzzle problems. Includes divisors, perfect numbers, the congruences of Gauss, scales of notation, the Pell equation, more. Solutions to all problems.

The entire collection of Martin Gardner's Scientific American columns are on one searchable CD! Martin Gardner's ``Mathematical Games'' column ran in Scientific American from 1956 to 1986. In these columns, Gardner introduced hundreds of thousands of readers to the delights of mathematics and of puzzles and problem solving. His column broke such stories as Rivest, Shamir and Adelman on public-key cryptography, Mandelbrot on fractals, Conway on Life, and Penrose on tilings. He enlivened classic geometry and number theory and introduced readers to new areas such as combinatorics and graph theory. The CD contains the following articles: (1) Hexaflexagons and Other Mathematical Diversions; (2) The Second Scientific American Book of Mathematical Puzzles and Diversions; (3) New Mathematical Diversions; (4) The Unexpected Hanging and Other Mathematical Diversions; (5) Martin Gardner's 6th Book of Mathematical Diversions from Scientific American; (6) Mathematical Carnival; (7) Mathematical Magic Show; (8) Mathematical Circus; (9) The Magic Numbers of Dr. Matrix; (10) Wheels, Life, and Other Mathematical Amusements; (11) Knotted Doughnuts and Other Mathematical Entertainers; (12) Time Travel and Other Mathematical Bewilderments; (13) Penrose Tiles to Trapdoor Ciphers; (14) Fractal Music, Hypercards, and more Mathematical Recreations from Scientific American and (15) The Last Recreations: Hydras, Eggs, and Other Mathematical Mystifications. A profile and interview with Martin Gardner is included in this collection.

Do all problems have solutions? Is complexity synonymous with difficulty? This original collection of mathematical puzzles and paradoxes proves that things aren't always what they seem! Readers will discover that nothing is as easy or as difficult as it looks and that puzzles can have one, several, or no solutions. The fun-filled puzzles begin with The Tricky Hole, a challenge that involves pushing a large coin through a small hole in a sheet of paper without ripping or making any cuts in the paper. Advance to the Elastic Playing Card, in which it's possible to cut a hole into a playing card big enough for someone to climb through. Other incredible puzzles include Elephants and Castles, Trianglized Kangaroo, Honest Dice and Logic Dice, Mind-reading Powers, and dozens more. Complete solutions explain the mathematical realities behind the fantastic-sounding challenges.

This book is a collection of over 200 problems that David Singmaster has composed since 1987. Some of the math problems have appeared in his various puzzle columns for BBC Radio and TV, Canadian Broadcasting, Focus (the UK popular science magazine), Games and Puzzles, the Los Angeles Times, Micromath, the Puzzle a Day memo pad and the Weekend Telegraph. While some of these are already classics, many of the puzzles have not been published elsewhere previously. Puzzle enthusiasts of all ages will find here arithmetic problems, properties of digits; monetary problems; alpha-metics; Diophantine problems; magic figures; sequence problems; logical problems; geometric problems; physics problems; combinatorial problems; geographic problems; calendar problems; clock problems; dissection problems and verbal problems. Contents:General Arithmetic PuzzlesProperties of DigitsMagic FiguresMonetary ProblemsDiophantine RecreationsAlphameticsSequence PuzzlesLogic PuzzlesGeometrical PuzzlesGeographic ProblemsCalendrical ProblemsClock ProblemsPhysical ProblemsCombinatorial ProblemsSome Verbal Puzzles Readership: General public. Key Features:The problems are generally original, though some are corrections or extensions of known problemsA number are open-ended, leading to unsolved problems for the readerKeywords:Metagrobologists;Alphametics;Magic Figures;Clock Problems;Diophantine "I believe the book will be welcome by amateur, as well as professional, metagrobologists. Many of the puzzles could be used as warm-up exercises to engender creative atmosphere in a math class. I am sure that many a math teacher will agree with this assessment." Alexander Bogomolny Cut The Knot

Twelve essays take a playful approach to mathematics, investigating the topology of a blanket, the odds of beating a superior tennis player, and how to distinguish between fact and fallacy.

Many of the most important mathematical concepts were developed from recreational problems. This book uses problems, puzzles, and games to teach students how to think critically. It emphasizes active participation in problem solving, with emphasis on logic, number and graph theory, games of strategy, and much more. Includes answers to selected problems. Index. 1980 edition.

The author presents a selection of pieces from his Scientific American "Mathematical Games" column, presenting puzzles and concepts that range from arithmetic and geometrical games to the meaning of M.C. Escher's artwork.

A short introduction perfect for any 16 to 18 year old about to begin studies in mathematics.

This book convenes a selection of 200 mathematical puzzles with original solutions, all celebrating the inquisitive and inspiring spirit of Nobuyuki “Nob” Yoshigahara – a legend in the worldwide community of mathematical and mechanical puzzles. A graduate from the Tokyo Institute of Technology, Yoshigahara invented numerous mechanical puzzles and published over 80 puzzle books. In 2003, he was honored with the Sam Loyd Award, given by the Association for Games & Puzzles International to individuals who have been made a significant contribution to the world of mechanical puzzles. In this work, the reader

will find some of the most ingenious puzzles ever created, organized in ten categories: Logic, matchstick, maze, algorithmic, combinatorial, digital, number, geometric, dissection, and others. Some of them could rivalry with those found at Mathematical Olympiads tests around the globe; others will work as powerful brain teasers for those with an interest in problem-solving. Math teachers, curious students of any age and even experienced mathematicians with a taste for the fun in science can find in this book unconventional paths to develop their problem-solving skills in a creative way.

The noted expert selects 70 of his favorite "short" puzzles, including such mind-bogglers as The Returning Explorer, The Mutilated Chessboard, Scrambled Box Tops, and dozens more involving logic and basic math. Solutions included.

This is, quite simply, the best and most popular puzzle book ever published in the Soviet Union. Since its first appearance in 1956 there have been eight editions as well as translations from the original Russian into Ukrainian, Estonian, Lettish, and Lithuanian. Almost a million copies of the Russian version alone have been sold. Part of the reason for the book's success is its marvelously varied assortment of brainteasers ranging from simple "catch" riddles to difficult problems (none, however, requiring advanced mathematics). Many of the puzzles will be new to Western readers, while some familiar problems have been clothed in new forms. Often the puzzles are presented in the form of charming stories that provide non-Russian readers with valuable insights into contemporary Russian life and customs. In addition, Martin Gardner, former editor of the Mathematical Games Department, Scientific American, has clarified and simplified the book to make it as easy as possible for an English-reading public to understand and enjoy. He has been careful, moreover, to retain nearly all the freshness, warmth, and humor of the original. Lavishly illustrated with over 400 clear diagrams and amusing sketches, this inexpensive edition of the first English translation will offer weeks or even months of stimulating entertainment. It belongs in the library of every puzzlist or lover of recreational mathematics.

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.

Sixteen columns from the French edition of Scientific American feature oddball characters and wacky wordplay in a mathematical wonderland of puzzles and games that also imparts significant mathematical ideas. 1992 edition.

This arsenal of tips and techniques eases new students into undergraduate mathematics, unlocking the world of definitions, theorems, and proofs.

Mathematical Recreations and Essays W. W. Rouse Ball For nearly a century, this sparkling classic has provided stimulating hours of entertainment to the mathematically inclined. The problems posed here often involve fundamental mathematical methods and notions, but their chief appeal is their capacity to tease and delight. In these pages you will find scores of "recreations" to amuse you and to challenge your problem-solving faculties-often to the limit. Now in its 13th edition, Mathematical Recreations and Essays has been thoroughly revised and updated over the decades since its first publication in 1892. This latest edition retains all the remarkable character of the original, but the terminology and treatment of some problems have been updated and new material has been added. Among the challenges in store for you: Arithmetical and geometrical recreations; Polyhedra; Chess-board recreations; Magic squares; Map-coloring problems; Unicursal problems; Cryptography and cryptanalysis; Calculating prodigies; ... and more. You'll even find problems which mathematical ingenuity can solve but the computer cannot. No knowledge of calculus or analytic geometry is necessary to enjoy these games and puzzles. With basic mathematical skills and the desire to meet a challenge you can put yourself to the test and win. "A must to add to your mathematics library."-The Mathematics Teacher We are delighted to publish this classic book as part of our extensive Classic Library collection. Many of the books in our collection have been out of print for decades, and therefore have not been accessible to the general public. The aim of our publishing program is to facilitate rapid access to this vast reservoir of literature, and our view is that this is a significant literary work, which deserves to be brought back into print after many decades. The contents of the vast majority of titles in the Classic Library have been scanned from the original works. To ensure a high quality product, each title has been meticulously hand curated by our staff. Our philosophy has been guided by a desire to provide the reader with a book that is as close as possible to ownership of the original work. We hope that you will enjoy this wonderful classic work, and that for you it becomes an enriching experience.

Contains puzzles that first baffle and then delight problem solving addicts. Grew out of a collaboration between Bob Tappay and Martin Gardner to enliven the learning of mathematics.

Seven problem-solving techniques include inference, classification of action sequences, subgoals, contradiction, working backward, relations between problems, and mathematical representation. Also, problems from mathematics, science, and engineering with complete solutions.

This is a collection of intriguing mathematical problems and activities arising from our everyday experience.

Numerous photographs and diagrams explain mathematical phenomena in series of thought-provoking expositions. From simple puzzles to more advanced problems, topics include psychology of lottery players, new and larger prime numbers, and more. 391 illustrations.

Some probability problems are so difficult that they stump the smartest mathematicians. But even the hardest of these problems can often be solved with a computer and a Monte Carlo simulation, in which a random-number generator simulates a physical process, such as a million rolls of a pair of dice. This is what Digital Dice is all about: how to get numerical answers to difficult probability problems without having to solve complicated mathematical equations. Popular-math writer Paul Nahin challenges readers to solve twenty-one difficult but fun problems, from determining the odds of coin-flipping games to figuring out the behavior of elevators. Problems build from relatively easy (deciding whether a dishwasher who breaks most of the dishes at a restaurant during a given week is clumsy or just the victim of randomness) to the very difficult (tackling branching processes of the kind that had to be solved by Manhattan Project mathematician Stanislaw Ulam). In his characteristic style, Nahin brings the problems to life with interesting and odd historical anecdotes. Readers learn, for example, not just how to determine the optimal stopping point in any selection process but that astronomer Johannes Kepler selected

his second wife by interviewing eleven women. The book shows readers how to write elementary computer codes using any common programming language, and provides solutions and line-by-line walk-throughs of a MATLAB code for each problem. Digital Dice will appeal to anyone who enjoys popular math or computer science. In a new preface, Nahin wittily addresses some of the responses he received to the first edition.

In this volume, world-leading puzzle designers, puzzle collectors, mathematicians, and magicians continue the tradition of honoring Martin Gardner, who inspired them to enter mathematics, to enter magic, to bring magic into their mathematics, or to bring mathematics into their magic. This edited collection contains a variety of articles connected t

A good puzzle is ingenious, frustrating and a-ha!-inducing. In this entertaining and utterly addictive book, Bellos will challenge you to pit your wits against pangrams, hidatos, chessboard puzzles and a Singaporean schoolchild's maths paper. Piece of cake, right? Only if you know the scientific method for cutting cake correctly. Organised from easy-peasy to ninja level - with stories of puzzle mysteries, histories and scandals along the way this book will make your hippocampus happy.

One of the largest puzzle collections — 430 brainteasers based on algebra, arithmetic, permutations, probability, plane figure dissection, properties of numbers, etc. Intriguing, witty, paradoxical productions of one of the world's foremost creators of puzzles. More than 450 illustration with Solution

Examples help explain the seven basic mathematical problem-solving methods, including inference, classification of action sequences, working backward, and contradiction

A Classroom-Tested, Alternative Approach to Teaching Math for Liberal Arts Puzzles, Paradoxes, and Problem Solving: An Introduction to Mathematical Thinking uses puzzles and paradoxes to introduce basic principles of mathematical thought. The text is designed for students in liberal arts mathematics courses. Decision-making situations that progress from recreational problems to important contemporary applications develop the critical-thinking skills of non-science and non-technical majors. The logical underpinnings of this textbook were developed and refined throughout many years of classroom feedback and in response to commentary from presentations at national conferences. The text’s five units focus on graphs, logic, probability, voting, and cryptography. The authors also cover related areas, such as operations research, game theory, number theory, combinatorics, statistics, and circuit design. The text uses a core set of common representations, strategies, and algorithms to analyze diverse games, puzzles, and applications. This unified treatment logically connects the topics with a recurring set of solution approaches. Requiring no mathematical prerequisites, this book helps students explore creative mathematical thinking and enhance their own critical-thinking skills. Students will acquire quantitative literacy and appreciation of mathematics through the text’s unified approach and wide range of interesting applications.

The history of mathematics is filled with major breakthroughs resulting from solutions to recreational problems. Problems of interest to gamblers led to the modern theory of probability, for example, and surreal numbers were inspired by the game of Go. Yet even with such groundbreaking findings and a wealth of popular-level books exploring puzzles and brainteasers, research in recreational mathematics has often been neglected. The Mathematics of Various Entertaining Subjects brings together authors from a variety of specialties to present fascinating problems and solutions in recreational mathematics. Contributors to the book show how sophisticated mathematics can help construct mazes that look like famous people, how the analysis of crossword puzzles has much in common with understanding epidemics, and how the theory of electrical circuits is useful in understanding the classic Towers of Hanoi puzzle. The card game SET is related to the theory of error-correcting codes, and simple tic-tac-toe takes on a new life when played on an affine plane. Inspirations for the book's wealth of problems include board games, card tricks, fake coins, flexagons, pencil puzzles, poker, and so much more. Looking at a plethora of eclectic games and puzzles, The Mathematics of Various Entertaining Subjects is sure to entertain, challenge, and inspire academic mathematicians and avid math enthusiasts alike.

Packed with more than a hundred color illustrations and a wide variety of puzzles and brainteasers, Taking Sudoku Seriously uses this popular craze as the starting point for a fun-filled introduction to higher mathematics. How many Sudoku solution squares are there? What shapes other than three-by-three blocks can serve as acceptable Sudoku regions? What is the fewest number of starting clues a sound Sudoku puzzle can have? Does solving Sudoku require mathematics? Jason Rosenhouse and Laura Taalman show that answering these questions opens the door to a wealth of interesting mathematics. Indeed, they show that Sudoku puzzles and their variants are a gateway into mathematical thinking generally. Among many topics, the authors look at the notion of a Latin square--an object of long-standing interest to mathematicians--of which Sudoku squares are a special case; discuss how one finds interesting Sudoku puzzles; explore the connections between Sudoku, graph theory, and polynomials; and consider Sudoku extremes, including puzzles with the maximal number of vacant regions, with the minimal number of starting clues, and numerous others. The book concludes with a gallery of novel Sudoku variations--just pure solving fun! Most of the puzzles are original to this volume, and all solutions to the puzzles appear in the back of the book or in the text itself. A math book and a puzzle book, Taking Sudoku Seriously will change the way readers look at Sudoku and mathematics, serving both as an introduction to mathematics for puzzle fans and as an exploration of the intricacies of Sudoku for mathematics buffs.

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.

"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"--

Discusses the mathematics of the chessboard and its problems, focusing on its history, the knight's tour problem, magic squares, domination, other variations, and independence.