BOOKS WITH PUZLES AND RECREATIONAL MATHEMATICS

ApSimon, H. (1984). ***Mathematical byways in Ayling, Beeling and Ceiling.*** **New York: Oxford University Press.**

Abstract: Unique and highly original, *Mathematical Byways* is a work of recreational mathematics, a collection of ingenious problems, their even more ingenious solutions, and extensions of the problems--left unsolved here--to further stretch the mind of the reader. The problems are set within the framework of three villages--Ayling, Beeling, and Ceiling--their inhabitants, and the relationships (spacial and social) between them.
The problems can be solved with little formal mathematical knowledge, although most require considerable thought and mental dexterity, and solutions are all clearly expounded in non-technical language. Stimulating and unusual, this book proves what Hugh ApSimon has known all along: mathematics can be fun! *--This text refers to an out of print or unavailable edition of this title.*

Bell, R. & Cornelius, M. (1998). ***Board Games round the world (A resource book for mathematical investigations)*****. New York: Cambridge University Press.**

Abstract: This book offers a selection of games from around the world, many ancient which seek to activate a spririt of enquiry and investigation in the reader. Each game is accompanied by an outline history, its rules and a list of suggested ways to build upon the basis of the game.

Benson, W.H. & Jacoby, O. (1976). ***New Recreations with Magic squares.*** **New York: Dover.**

Abstract: Illustrates the characteristics, properties, and construction of odd-, singly-even-, and doubly-even-order magic squares, providing enumeration problems and mathematical proofs.

Dresher, M. (1981). ***The Mathematics of Games of Strategy (Theory and Applications).*** **New York: Dover.**

Abstract: A noted research mathematician explores decision making in the absence of perfect information. His clear presentation of the mathematical theory of games of strategy encompasses applications to many fields, including economics, military, business, and operations research. No advanced algebra or non-elementary calculus occurs in most of the proofs.

Ewing, J. & Kosniowski, C. (1982). ***Puzzle it out: Cubes, Groups and puzzles.*** **New York: Cambridge.**

Abstract: It is not often that a puzzle appears which captures the imagination of the world. One hundred years ago it was the 14-15 Puzzle of Sam Loyd; now it's the cube invented by Erno Rubik. And if you have ever wondered how anyone could work out a solution to The Cube then by reading this little book you will find out that the answer is "by using groups". But you don't have to know any mathematics to understand what is going on. John and Czes introduce groups by using simple experiments with four coloured squares (which you can cut out from the book) and The Cube. They then explain how to analyse sequences of Cube moves and briefly summarise one solution to illustrate the ideas of group theory.
Armed with these ideas you'll be able to use "Super Moves" to help you become faster at solving The Cube. You'll also understand why it is impossible to solve some puzzles and how to use group theory to solve others. In fact, solutions to the "Cylinder Puzzle", the "8 Cubes Puzzle", the "Pyramid Puzzle" and "Instant Sanity" are given and there are some tips on how to solve other puzzles.
The authors have devised a challenging new puzzle which is included in the book. Try to solve it to test your skill and understanding.

Friedland, A.J. (1970). ***Puzzles in Math & Logic (100 new recreations).*** **New York: Dover.**

Abstract: 100 originals: permutations, logic, probability, number properties, etc. High school math needed, but even more, ingenuity.

Gardner, M. (1987). ***Riddles of the Sphynx (and other Mathematical puzzle Tales).*** **Washington, D.C: Mathematical Association of America.**

Abstract: This material was drawn from Gardner's column in Issac Asimov's Science Fiction Magazine. His riddles presented here incorporate the responses of his initial readers, along with additions suggested by the editors of this series. In this book, Gardner draws us from questions to answers, always presenting us with new riddles- some as yet unanswered. Solving these riddles is not simply a matter of logic and calculation, though these play a role. Luck and inspiration are factors as well., so beginners and experts alike may profiably exercise their wits on Gardner's problems, whose subjects range from geometry to word play to questions relating to physics and geology.

Gardner, M. (2001). ***The Colossal book of Mathematics (Classic Puzzles, Paradoxes and Problems).*** **New York: Norton.**

Abstract: No amateur or math authority can be without this ultimate compendium from America's best-loved mathematical expert. Whether discussing hexaflexagons or number theory, Klein bottles or the essence of "nothing," Martin Gardner has single-handedly created the field of "recreational mathematics." The Colossal Book of Mathematics collects Gardner's most popular pieces from his legendary "Mathematical Games" column, which ran in Scientific American for twenty-five years. Gardner's array of absorbing puzzles and mind-twisting paradoxes opens mathematics up to the world at large, inspiring people to see past numbers and formulas and experience the application of mathematical principles to the mysterious world around them. With articles on topics ranging from simple algebra to the twisting surfaces of Mobius strips, from an endless game of Bulgarian solitaire to the unreachable dream of time

travel, this volume is a substantial and definitive monument to Gardner's influence on mathematics, science, and culture.

Kordemsky, B.A. (1981). ***The Moscow Puzzles.*** **Harmondsworth Middx: Penguin.**

Abstract: Most popular Russian puzzle book ever published. Marvelously varied puzzles ranging from simple "catch" riddles to difficult problems. Lavishly illustrated with clear diagrams and amusing sketche

Lindgren, H. (1972). ***Recreational problems in geometric dissections & how to solve.*** **New York: Dover 1972.**

Abstract: If you are looking for something unique, try your hand at geometric dissections. Geometric dissections are puzzles based on the art of cutting up one geometric figure into pieces which can be reassembled to form another figure. The challenge is to create the new figure in as few pieces as possible, and this is not always as easy as you would think. For example, an octagon can be dissected into a square in as few as five pieces-quite remarkable!
The author, Harry Lindgren, is an Australian patent examiner who has become the leader in this field of recreational mathematics. Through the years he has created more of these puzzles than any other person, and in the process he has bettered many previous dissection records. The over 400 diagrams in his book represent the combined work of himself and others in such areas as polygons, stars, letters, curved figures, and solid figures. In presenting these dissections, he carefully examines the methods used in obtaining them, such as strips, tessellations, RTF's, and just plain ingenuity! The original text has been updated by Greg Frederickson, a math buff who has improved on and extended certain parts of Lindgren's work. This book will appeal to the amateur problem solver who is looking for diverting mathematical puzzles to challenge his ingenuity. Yet these puzzles do not require any profound understanding of mathematics, or for that

matter, any tedious computations. And despite the fact that the author claims that these dissections have no practical application (outside of puzzles) , it is certainly one recreation that will increase your grasp of geometry while giving you hours of entertainment and fun. And who knows, you may discover ways of improving Lindgren's dissections, or even come up with new dissections of your own!

Packel, E. (1981). ***The Mathematics of games and Gambling.*** **Washington, D.C: Mathematical Association of America.**

Abstract: You can't lose with this MAA Book Prize winner if you want to see how mathematics can be used to analyze games of chance and skill. Roulette, craps, blackjack, backgammon, poker, bridge, lotteries and horse races are considered here in a way that reveals their mathematical aspects. The tools used include probability, expectation, and game theory. No prerequisites are needed beyond high school algebra. No book can guarantee good luck, but this book will show you what determines the best bet in a game of chance or the optimal strategy in a strategic game. Besides being an excellent supplement to a course on probability and good bed-side reading, this book's treatment of lotteries should save the reader some money.

Phillips, H. (1961). ***My best puzzles in mathematics.*** **New York: Dover.**

Abstract: There is little that I need say by way of introduction to this collection of puzzles. They are all strictly "mathematical," though the mathematical knowledge necessary for solving them is, in all but a handful of cases, elementary. That is because these puzzles have all been published serially in various newspapers and magazines, and their appeal would be negligible if their solution demanded advanced mathematics. They appear here, with their original wording unchanged, except that, where puzzles involve monetary calculations, I have converted pounds, shillings, and pennies into dollars and cents. The factual basis of many of these puzzles is derived from various games, e.g., contract bridge. A good many are based on Britain's national game: association football ("soccer"). You don't need to know this game to tackle the puzzles based on it. Its scoring is simplicity itself: each side, if it scores at all, merely scores one, two, or more goals.

Rapoport, A. (1966). ***Two-Person Game Theory.*** **Ann Arbor: University of Michigan Press.**

Abstract: A noted expert presents clearly written discussions of essential ideas related to the highly useful mathematical approach to human behavior and decision-making. His lucid, accessible treatment examines such concepts as "utility," "strategy," and the difference between "non-zero" and "zero-sum" games. A minimum of mathematical prerequisites makes it accessible to non-mathematicians.

Rouse Ball, W.W. (revised by H.S.M. Coxeter) (1962). ***Mathematical Recreations and Essays.*** **New York: MacMillan.**

Abstract: This classic work offers scores of stimulating, mind-expanding games and puzzles: arithmetical and geometrical problems, chessboard recreations, magic squares, map-coloring problems, cryptography and cryptanalysis, much more.

Straffin, P.D. (1993). ***Game Theory and Strategy.*** **Washington, D.C: Mathematical Association of America.**

Abstract: This book pays careful attention to applications of game theory in a wide variety of disciplines. The applications are treated in considerable depth. The book assumes only high school algebra, yet gently builds to mathematical thinking of some sophistication. Game Theory and Strategy might serve as an introduction to both axiomatic mathematical thinking and the fundamental process of mathematical modelling. It gives insight into both the nature of pure mathematics, and the way in which mathematics can be applied to real problems.

Summers, G.J. (1968). ***New puzzles in logical deduction.*** **New York: Dover.**

Abstract: Fifty puzzles. High school math and sharp thinking. Solutions.

Wells, D. (1986). ***The Penguin dictionary of Curious and Interesting Numbers.*** **Harmondsworth Middx: Penguin.**

Abstract: This dictionary of numbers, arranged in order of magnitude, exposes the fascinating facts about certain numbers and number sequences. The aim of the book is to entertain and enthral the reader, which it certainly does.

Williams, J.D. (1986). ***The Compleat Strategyst (Being a Primer on the Theory of Games of Strategy).*** **New York: Dover.**

Abstract: This entertaining text is essential for anyone interested in game theory. Only a basic understanding of arithmetic is needed to grasp the necessary aspects of strategy games for two, three, four, and more players that feature two or more sets of inimical interests and a limitless array of zero-sum payoffs.

Winkler, P. (2004). ***Mathematical Puzzles (A Connoisseur's Collection).*** **Natik, MA: A.K. Peters.**

Abstract: Collected over several years by Peter Winkler, of Bell Labs, dozens of elegant, intriguing challenges are presented in Mathematical Puzzles. The answers are easy to explain, but without this book, devilishly hard to find. Creative reasoning is the key to these puzzles. No involved computation or higher mathematics is necessary, but your ability to construct a mathematical proof will be severly tested--even if you are a professional mathematician. For the truly adventurous, there is even a chapter on unsolved puzzles.

Winkler, P. (2007). ***Mathematical Mind-Benders.*** **Natik, MA: A.K.Peters.**

Abstract: Peter Winkler is at it again. Following the enthusiastic reaction to Mathematical Puzzles: A Connoisseur s Collection, Peter has compiled

a new collection of elegant mathematical puzzles to challenge and entertain the reader. The original puzzle connoisseur shares these puzzles, old and new, so that you can add them to your own anthology. This book is for lovers of mathematics, lovers of puzzles, lovers of a challenge. Most of all, it is for those who think that the world of mathematics is orderly, logical, and intuitive-and are ready to learn otherwise!