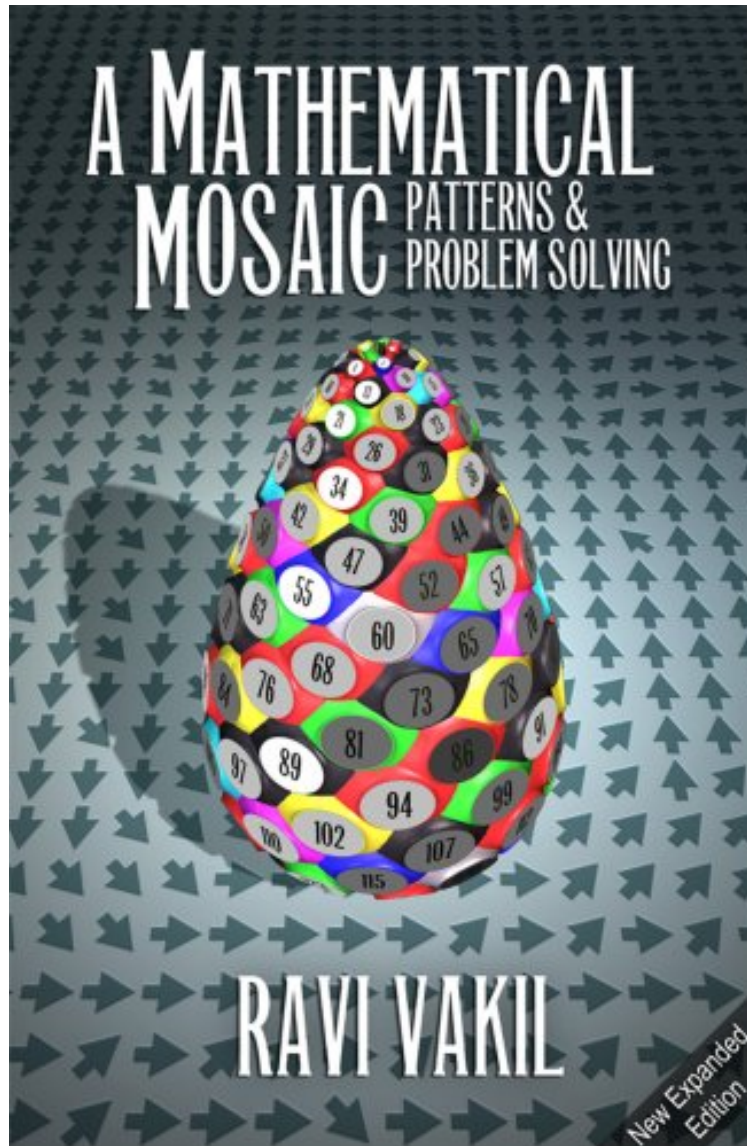


[Download] A Mathematical Mosaic: Patterns Problem Solving (Revised Edition)

## A Mathematical Mosaic: Patterns Problem Solving (Revised Edition)

Ravi Vakil

ebooks / Download PDF / \*ePub / DOC / audiobook



[Download](#)

[Read Online](#)

#389917 in Books Brendan Kelly Publishing Inc. 2007-09-28 Original language: English PDF # 1 .0 x .0 x .0l, .0 Binding: Perfect Paperback 288 pages | File size: 76.Mb

**Ravi Vakil : A Mathematical Mosaic: Patterns Problem Solving (Revised Edition)** before purchasing it in order to gauge whether or not it would be worth my time, and all praised A Mathematical Mosaic: Patterns Problem Solving (Revised Edition):

0 of 0 people found the following review helpful. Five Stars By gatorgiggreat book, very well written and a pleasure to

read.0 of 0 people found the following review helpful. Five StarsBy DmitriiGreat book1 of 1 people found the following review helpful. The Best Easy Hard Math Book EverBy David RothI have a BA in math and teach high school math. I think the book has the best collection of doable challenging math problems I've ever seen. These problems are beautiful, hard and rewarding, yet a very keen high school student will be able to do many of them. The book complements the problems with wonderful asides about the topics themselves and about mathematicians--both young and ancient--which give a lot of human interest to the math. There is nothing rote or dull in this book. I recommend it wholeheartedly to any highly enthusiastic math student or math teacher.

Ravi Vakil, described in the San Francisco Chronicle as a legend in the world of math competitions has finally released his long-awaited second edition of *A Mathematical Mosaic: Patterns Problem Solving*. Regarded by many as a seminal book in the field of mathematics competitions, the first edition of *A Mathematical Mosaic* has received wide acclaim from mathematics teachers, professors and the mathematics community at large. In the pages of this book, Ravi shares what mathematics is really about: beauty, elegance, and the discovery of deep and interconnected patterns. These patterns of nature are often best understood through puzzles and problems, both easy and hard. He also profiles eleven other Olympiad winners including Noam Elkies, the youngest professor to receive tenure at Harvard. This book is a must for teachers seeking to challenge their best students, and for students preparing for mathematics competitions.

There are different books on my shelf. Some are large like dinosaurs: these are textbooks. Others are much smaller, but their educational value may be greater. For example, Kordemsky's book [3] contributed a lot to Russian childrens' interest in mathematics although its English edition fits in a hand. The book I am going to discuss fits in a coat pocket, but it speaks in an interesting and understandable way about number theory, combinatorics, game theory, geometry, and calculus, to say nothing about magic tricks, puzzles and other digressions. What is most important is that whenever Vakil starts to discuss something, he never leaves the reader without a piece of exact, rigorous knowledge. This is a book about mathematics, not about its fuzzy placebo. Ravi Vakil tries to encourage curiosity, a sense of beauty, and the love of knowledge. This is a book I would like to have read as a boy. Why? Because it addresses the normal curiosity of children. It contains many good problems, facts, and stories. It is a mixture of just those ingredients which are most useful for children. Vakil enjoys ideas that seem simple if you already know them, but may seem paradoxical if you don't. One of them is presented as a card trick (p. 44): I ask you to shuffle a deck of cards thoroughly. Then I ask for them back (face down). Carefully examining the backs of the cards, I separate them into two piles. I then claim that, through the power of magic, I've made sure that the number of black cards in the first pile is the number of red cards in the second pile! Although Vakil's book is intended to be recreative and facultative, it contains many facts that are indispensable for mathematical literacy, including: Criteria for divisibility. Those for 2, 3 and 7 are proved; other proofs are left for the reader (pp. 23, 29). Let  $g(x)$  denote any polynomial in  $x$ . Then the remainder when  $g(x)$  is divided by  $x - a$  is  $g(a)$ . 2 is irrational (p. 121). There are infinitely many primes (p. 124). Heron's formula for the area of a triangle (p. 160) The harmonic series diverges (p. 180). This book contains several personal profiles of gifted youngsters with whom Vakil became acquainted at olympiads. Vakil writes several lines about how they found their way into mathematics. More than once Vakil stresses that mathematics is beautiful. In his preface he writes: Math is a uniquely aesthetic discipline; mathematicians use words like beauty, depth, elegance, and power to describe excellent ideas --American Mathematical Monthly-Andr ToomRavi Vakil has put together a collection of wonderful topics from number theory through combinatorics to game theory in a fashion that seventh- and eighth-grade students can handle yet high school students will find challenging. His book is divided into two parts. Part 1 introduces to the young reader a number of mathematics topics that will be very useful in part 2. For example, in the first section, Number Theory, such topics as calculating tricks, divisibility rules with proofs of why they work, and magic squares are investigated fully and clearly. In part 2, many of the earlier topics are revisited, but the level of difficulty is increased. In 'Number Theory Revisited,' an in-depth study of rational and irrational numbers, a fascinating painted-school-lockers problem, and other topics challenge students in an entertaining manner. Perhaps the best features of the book, however, are the historical digressions on great mathematicians and short personal profiles of contemporaries of the author. These glimpses into the lives of young male and female mathematicians make this book very much worth its price. Without a doubt, this book is a must for any library, teacher's reference, or student's amusement. --The Mathematics Teacher, Vol 89, #7- John CocharoAbout the AuthorRavi Vakil s resume reads like a dictionary of superlatives. During his high school years he won every major mathematics competition. These include first place standing in the Canadian Mathematical Olympiad for two successive years, first place standing in North America on the USA Mathematical Olympiad, and two gold medals and one silver medal in the International Mathematical Olympiad (including a perfect score). He also won first prize in the Canadian Association of Physicists Competition and led his high school computer team to three provincial championships. During his undergraduate years at the University of Toronto, Ravi raised his brilliant achievements to new heights. In all four years he placed among the top five competitors in the prestigious North American William Lowell Putnam Mathematical Competition, earning him the top award of Putnam Fellow in each year. He graduated in 1992 with B. Sc. and M. Sc. degrees; for

his B. Sc., he was awarded the Governor General's Medal for the highest graduating marks at the University of Toronto. Ravi's extraordinary achievements have not prevented him from pursuing his many other interests. These include squash, debating, student government, journalism, and Amnesty International. For this breadth of involvement he has received numerous scholarships including the John H. Moss Scholarship for the best all-round graduating student at the University of Toronto. Ravi Vakil is a compassionate person with an eager willingness to help others. He has coached the Canadian Team at the International Mathematical Olympiad from 1989 through 1996. He was also cofounder of Mathematical Mayhem, a mathematical problem-solving journal for high school and undergraduate students the only student-run journal of its kind in the English-speaking world. This book was written while Ravi was a graduate student. Since the first edition was completed, Ravi received his Ph.D. in pure mathematics at Harvard in 1997, and subsequently taught at Princeton and M.I.T. before moving to Stanford in 2001. He is an algebraic geometer, and his work touches on many other parts of mathematics, including topology, string theory, applied mathematics, combinatorics, number theory, and more. His awards include the Alfred P. Sloan Research Fellowship, the National Science Foundation CAREER Award, the American Mathematical Society Centennial Fellowship, and the Dean's Award for Distinguished Teaching. In 2004, he traveled to the White House to receive the Presidential Early Career Award for Scientists and Engineers. He continues to work extensively with talented younger mathematicians at all levels, from high school (through math circles, camps, and olympiads) through recent Ph.D. s.