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Empowering the Mentor of the Experienced Mathematics Teacher, Gwen Zimmermann, Patricia Guinee, Linda M. Fulmore, and Elizabeth Murray, eds., 2009. 73 pp., $22.95 paper. Stock no. 13491. ISBN 978-0-87353-626-4. National Council of Teachers of Mathematics; www.nctm.org.

This book aims to help teachers understand the value and importance of mentoring and to guide them in becoming mentors. It consists of fifty-two vignettes, each written by a different author or team, designed to encourage, inform, and advise mathematics teachers who mentor others. The polyphony and the experiential variety of the vignettes constitute the book's strength. The articles are organized into seven sensible, helpful sections with introductions and inspiring quotations.

The book would be valuable to all educators at all levels. (Although the context is mathematics, nothing here is unique to mathematics.)

—Sherry S. Herron
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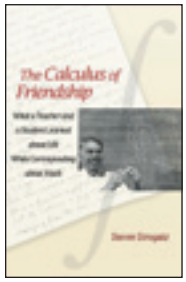
FROM OTHER PUBLISHERS

The Calculus of Friendship: What a Teacher and a Student Learned about Life While Corresponding about Math, Steven Strogatz, 2009. 192 pp., $19.95 cloth. ISBN 978-0-691-13493-2. Princeton University Press; www.press.princeton.edu.



This is the story of a friendship between a mathematics teacher and a former student who pursues a mathematics degree and eventually receives an appointment as a professor. The dialogue about mathematics solidifies this friendship and also covers a deeper appreciation of what this teacher inspired in this student. In a mathematical sense, as time progresses, the student becomes the teacher. From the perspective of embracing and living life to the fullest, the former teacher remains the inspiration.

This story will draw in both the novice and the veteran. Teachers of mathematics will appreciate the long-term effect their teaching can have on students. The included mathematics can be related to both high school and undergraduate calculus sequences to demonstrate some interesting, thought-provoking, and "big picture" connections to these courses.

Some of the mathematics is beyond what many students in these courses are capable of, but the story is still enjoyable. More advanced students will appreciate the mathematics as well as the story, but the content seems more appropriate for teachers. As an aid for professional development, the book could create dialogue around the teaching and learning of calculus. Excerpts or the entire text could be part of an undergraduate methods course in mathematics.

—Michelle (Shelly) Ray Parsons
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Finite Mathematics, Models, and Structure, William J. Adams, 2009. 619 pp., $23.99 paper. ISBN 978-1-4363-3416-7. Xlibris; www.Xlibris.com.

This book presents an accessible although scant introduction to several mathematics branches—systems of linear equations and inequalities, linear programming, simple mathematical modeling, matrix operations, probability, Markov chains, normal distributions, and game theory. Adams rightly and relentlessly reminds us that "mathematical models can only provide us with valid conclusions with respect to our assumptions" (p. 369) and repeatedly warns about the danger of oversimplifying reality for the sake of clean mathematical models. He warns against overreliance on technology but never once uses technology, even when appropriate. Three-page solutions of six-variable systems (pp. 62–65) and other unnecessarily drawn-out solutions were frustrating. Virtually all the problem sets are mirror images of the text examples, but Adams never requires students to extend what they learn.

Other readers may appreciate this book, but I found it to be at least twice as long as needed to accomplish its goals. It provides simple and accessible explanations, but the lack of technology use, innovative problems, and current applications as well as the painfully long problem solutions would keep me from using it in my classes. Talented students are likely to find it frustrating.

—Chris Harrow
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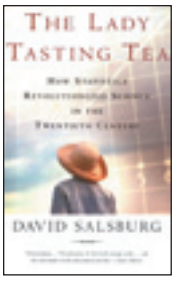
The Lady Tasting Tea: How Statistics Revolutionized Science in the Twentieth Century, David Salsburg, 2001. 352 pp., $17.00 paper. ISBN 978-0-8050-7134-2. Henry Holt and Company; www.henryholt.com.

Recounting the development of statistics as a discipline in its own right and as a



revolutionary scientific tool, the author describes the ideological shift within science from viewing variation as an unfortunate lack of precision to viewing it as a source of information. Writing chronologically, Salsburg touches on the major scholars of twentieth-century statistics and their contributions to the field, from Pearson and his correlation coefficient through Fisher, Kolmogorov, Tukey, and many others.

Salsburg's engaging biographical narratives of statistical pioneers are the book's principal strength. He digs deep, giving readers a window into these scientists' lives, what they believed philosophically, what they discovered or invented and why it is important, and the personal and historical conflicts they faced. Unfortunately, Salsburg is so intent on making his book accessible to a wide audience that equations, graphs, and precise definitions are completely absent. This omission not only detracts from the book's mathematical value but also means that many concepts that are difficult to explain without a picture, example, or formula (e.g., normal distribution, standard deviation, correlation) are left unclear.

The assumed reading level and background knowledge of science, history, and statistics make this book appropriate for students in the upper grades of high school and higher. I would recommend this book to a teacher or a student of statistics interested in learning the stories behind the mathematics. In addition, it would be a great supplemental text for an AP Statistics class.

—Adam Kalman
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Lessons in Geometry: I. Plane Geometry, Jacques Hadamard, 2008. 330 pp., $59.00 cloth. ISBN 978-0-8218-4367-3. American Mathematical Society; www.ams.org.

In 1898 Jacques Hadamard, the French mathematician and teacher, wrote a book to help his students understand Euclid's *Elements*. Hadamard believed that students needed additional help to understand the principles of geometry because of changes in the world and in how students learn. This book is an exact translation of the thirteenth edition (1947) of Hadamard's first volume.

The book consists of text and geometric diagrams divided into four sections that investigate the straight line, the circle, similarity, and areas. Statements, definitions, and theorems are presented and followed by exercises (or problems) for each topic. Hadamard's writing was formal, stiff, and often clumsy, so updated footnotes are provided to clarify words, sentences, and ideas in this translation. In addition, a disk formatted for use with Texas Instruments TI-Inspire™ and with interactive documents is included with the book.

This is an excellent book for high school or college students interested in a rigorous, advanced study of geometry and a historical understanding of plane geometry.

—Dana Pomykal Franz
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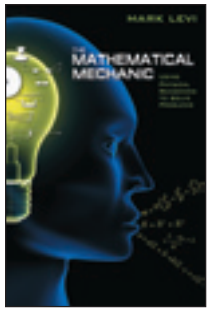
The Mathematical Mechanic, Mark Levi, 2009. 196 pp., $19.95 cloth. ISBN 978-0-691-14020-9. Princeton University Press; www.press.princeton.edu.



The Mathematical Mechanic documents novel ways of viewing physics as a method of understanding mathematics. Levi uses physical arguments as tools to conjecture about mathematical concepts before providing rigorous proofs. He explores topics ranging from the Pythagorean theorem and the centroid of a triangle to integrals and dot products, emphasizing first the physical meaning of the problems. For instance, the classic calculus problem of finding the proportions of a cylindrical can of minimal total surface area containing a given volume is solved by using a tension-and-equilibrium argument. Concepts such as potential energy, electrical currents, and centers of mass shed light on common high school mathematics problems such as the shortest path, arithmetic and geometric means, ellipses, and points of concurrency.

The book is intended for readers with a precalculus and basic geometry background, although calculus concepts are introduced in the latter half. The necessary physics prerequisites are explained in the appendix. Generally, the book is best suited for students taking physics and calculus or teachers seeking creative lesson examples and supplemental challenge problems for their honors geometry, precalculus, and calculus classes.

The Mathematical Mechanic is an excellent display of creative, interdisciplinary problem-solving strategies. The author has explained complex concepts with simplicity, yet the mathematics is accurate. I recommend the book as a resource for creative high school and college teachers of honors students.

—Estelle M. Lockhart
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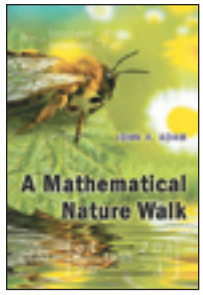
A Mathematical Nature Walk, John A. Adam, 2009. 280 pp., $27.95 cloth. ISBN 978-0-691-12895-5. Princeton University Press; www.press.princeton.edu.



Teachers of mathematics—at all levels—have become accustomed to hearing the age-old question, "When will we ever have to use this?" *A Mathematical Nature Walk* provides a partial answer. This book includes ninety-six vignettes (actually, questions) of observations of natural phenomena and some explanations using mathematics and physical principles. The mathematical level runs from arithmetic through calculus, and the physical phenomena are not beyond the basic science that all students should know by the time they graduate from high school. This book would serve mathematics teachers or interested students from middle grades through college.

Adam has divided his nature walk into twelve different natural areas—from

just "getting our feet wet" with answering how many head of cattle would be required to satisfy the 1978 daily demand for meat in the United States (question 20) to multiple questions (twenty-two, in fact) about the sky and rainbows. None of these questions takes too long to ask or to answer, and all would serve as nice examples for classes that could appreciate the science well enough to understand how mathematics can help provide the answer (they would be especially appropriate for use with high school or college courses). The only drawback: There is no index to the mathematics used in modeling a problem—probably a conscious decision on the author's part to point out that one cannot know *a priori* what mathematics is best used for any problem.

Although not all students should be expected to become applied mathematicians and modelers of the first order, all should gain some respect for what mathematics can and cannot do in describing the physical world. For teachers who are interested in seeing how what they teach might be used or for students or parents who might be interested in seeing how mathematics might be used, this is an intriguing book.

—David Royster
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Mathematics in Historical Context, Jeff Suzuki, 2009. 424 pp., $58.50 cloth. ISBN 978-0-88385-570-6. Mathematical Association of America; www.maa.org.

When coffee began to supplant gin as a drink of choice in seventeenth-century London, mathematicians, including Isaac Newton's successor, found a new classroom in which to introduce and debate new developments. John Napier, before inventing logarithms, predicted that the Second Coming of Christ would occur in 1698.

Such gems light up *Mathematics in Historical Context*. Suzuki's goal is to show the relationships among "mathematicians, mathematics, and society," and his narrative skips briskly back and forth among them. In just one example, he discusses Al-Khayyami's poetry (known in English as *The Rubayat of Omar Khayyam*), his work as a geometer, and the use of tesselations in Islamic architecture.

Suzuki's strength and weakness are both bound up in his scope—four hundred pages that follow mathematics and society from ancient Egypt through World War II. Early Islam's development is packed into four pages; the interplay between communism and mathematics in the Soviet Union under Stalin is covered in five. Suzuki is a fount of interesting stories, but the scale of his narrative requires that most ideas are hinted at rather than developed.

Mathematics in Historical Context would make an excellent gift for a mathematician or mathematics teacher who loves history. However, because this book assumes so much mathematical background, even gifted high school students could not use it. For readers who have seen the mathematics, even if years ago in a college course, Suzuki's clear writing invokes the principal ideas quickly, and his interplay with the social times is often fascinating.

—Steven Unruhe
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Philosophy of Mathematics and Natural Science, Hermann Weyl, 2009. xvii + 311 pp., $35.00 paper. ISBN 978-0-691-14120-6. Princeton University Press; www.press.princeton.edu.

Hermann Weyl's book was originally published in German in 1927 as part of a text by R. Oldenburg. A second edition became available in English in 1949. Now Princeton University has released a new edition in paperback with an introduction by Frank Wilczek, a recipient of the 2004 Nobel Prize in Physics.

This book contains three major sections: mathematics (15 chapters), natural science (8 chapters), and appendixes (6). The section on mathematics covers a broad spectrum of mathematics and its underlying philosophy. The natural science section is much shorter, but its content is profound and perhaps beyond many readers' level of comprehension. The appendixes section, which Weyl wrote in 1947, was meant to bridge the intellectual gap between science and mathematics that evolved between the original publication and the English language translation, published twenty-two years later. In Appendix A, he discusses in great detail Kurt Gödel's discovery in 1931 that Hilbert's effort to establish consistency in a formal mathematical system was not possible. Weyl's exposition is detailed, profound, and not an easy read.

Weyl prefaces the sections on mathematics and natural science in his book as "intended to be a report on some of the more important philosophical results and viewpoints which have emerged primarily from research within the fields of mathematics and the exact empirical sciences." He accomplishes his task with profound exposition and many historical references to mathematicians, philosophers, and scientists. Liebniz is cited more than forty times.

Readers will be confronted with dozens of phrases and quotations in Greek, Latin, German, and French. In addition, readers will need a solid background with some depth in the study of such philosophers as Aristotle, Plato, Kant, Hume, and others to appreciate Weyl's attempt to convey his ideas on the change in attitude and understanding of what is real, absolute, logical, and so forth. Understanding Weyl's role with Einstein requires familiarity with the general and special theory of relativity.

Philosophy of Mathematics and Natural Science, while very well written, is truly a challenge to read.

—Charles W. Mitchell, Jr. (retired)
Goodyear, AZ 85395-8191

Pythagoras' Revenge: A Mathematical Mystery, Arturo Sangalli, 2009. 224 pp., $24.95 cloth. ISBN 978-0-691-04955-7. Princeton University Press; www.press.princeton.edu.

A *DaVinci Code*-esque adventure, this book explores the notion that a document written by Pythagoras in his own hand in 500 B.C.E. could somehow remain undiscovered until now. In the story, a group of neo-Pythagoreans tries to find this rumored manuscript and the

reincarnated Pythagoras himself.

The book is quite accessible to middle school and high school students, but the story itself is probably a bit contrived for older readers. At times Sangalli's writing can be fun, but at other times it is a bit smug. Older readers or those with a more mathematical background could find the style trying at times.

That said, Sangalli does a great job of weaving interesting Pythagorean history in with some modern mathematics (e.g., a puzzle with no solution, a talk about attempts to define randomness, and so on), but he runs into problems when he tries to construct a plot around it all. I admire his attempts to create a mathematical-historical fiction, but the story just does not seem to go anywhere. Some excerpts from his book could be used in regular and AP Statistics classes, for example, to delve deeper into the concept of randomness. That discussion is quite interesting but has little to do with the story itself.

The level of drama and the large number of interrelated characters build throughout the book toward a climax—that never comes. The book does not so much end as abruptly stops.

—David Custer
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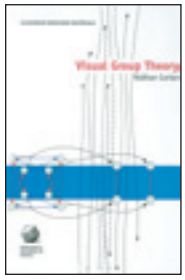
Visual Group Theory, Nathan Carter, 2009. 334 pp., $71.95 cloth. Catalog Code VGT; ISBN 978-0-88385-757-1. Mathematical Association of America; www.maa.org.



A look at group theory from a visual perspective, this book was designed for use as a supplement in an undergraduate-level abstract algebra course. I do not teach abstract algebra, but I remember taking the course and feeling that I was missing something. This book has helped me more fully internalize the ideas and concepts of group theory, and I believe it could do the same for many undergraduate students.

This book is a great resource, worth referring to for notes, alternative approaches, and good exercises. In addition, Carter refers to a free computer program (Group Explorer) he used throughout the book to create the diagrams and visualizations. Students are given a chance to use this program through exercises that allow for a more concrete understanding.

The book's novel approach is refreshing. Although this book does not cover an entire abstract algebra course, it is a great supplement and worth adding to your library, even if you are looking for only a recreational stroll through group theory.

—Michael Davis
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