

By William Dunham The Calculus Gallery Masterpieces From Newton To Lebesgue

The 2000-Year Quest to Solve the Mathematical Problems of Antiquity
 A Structured Approach
 The Calculus Gallery
 Mathematics and Its History
 The Command to Look
 Zero
 A History of the Big Ideas
 The History of the Calculus and Its Conceptual Development
 The Mathematical Universe
 From Archimedes to Newton to Its Role in Science
 Learning Basic Calculus
 How to Read Historical Mathematics
 How a Mathematical Approach to Life Adds Up to Health, Wealth, and Love
 Emmy Noether
 Elements of Algebra
 The Calculus of Friendship
 Count Like an Egyptian
 Journey Through Genius
 The Genius of Euler: Reflections on his Life and Work
 A Concise Edition
 A History of the Big Ideas
 Connections in Discrete Mathematics
 Calculus Simplified
 The Polyhedron Formula and the Birth of Topology
 A Hands-on Introduction to Ancient Mathematics
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 Chronicles by the Explorers
 A Concise History of Mathematics
 Real Analysis and Applications
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 Infinite Powers
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The 2000-Year Quest to Solve the Mathematical Problems of Antiquity Penguin Books

Bond and Keane explicate the elements of logical, mathematical argument to elucidate the meaning and importance of mathematical rigor. With definitions of concepts at their disposal, students learn the rules of logical inference, read and understand proofs of theorems, and write their own proofs all while becoming familiar with the grammar of mathematics and its style. In addition, they will develop an appreciation of the different methods of proof (contradiction, induction), the value of a proof, and the beauty of an elegant argument. The authors emphasize that mathematics is an ongoing, vibrant discipline; its long, fascinating history continually intersects with territory still uncharted and questions still in need of answers. The authors' extensive background in teaching mathematics shines through in this balanced, explicit, and engaging text, designed as a primer for higher-level mathematics courses. They elegantly demonstrate process and application and recognize the byproducts of both the achievements and the missteps of past thinkers. Chapters 1-5 introduce the fundamentals of abstract mathematics and chapters 6-8 apply the ideas and techniques, placing the earlier material in a real context. Readers' interest is continually piqued by the use of clear explanations, practical examples, discussion and discovery exercises, and historical comments.

A Structured Approach Springer

This introductory calculus text was developed by the author through his teaching of an honors calculus course at Notre Dame. The book develops calculus, as well as the necessary trigonometry and analytic geometry, from within the relevant historical context, and yet it is not a textbook in the history of mathematics as such. The notation is modern, and the material is selected to cover the basics of the subject. Special emphasis is placed on pedagogy throughout. While emphasizing the broad applications of the subject, emphasis is placed on the mathematical content of the subject.

[The Calculus Gallery](#) Springer Science & Business Media

This textbook introduces readers to real analysis in one and n dimensions. It is divided into two parts: Part I explores real analysis in one variable, starting with key concepts such as the construction of the real number system, metric spaces, and real sequences and series. In turn, Part II addresses the multi-variable aspects of real analysis. Further, the book presents detailed, rigorous proofs of the implicit theorem for the vectorial case by applying the Banach fixed-point theorem and the differential forms concept to surfaces in \mathbb{R}^n . It also provides a brief introduction to Riemannian geometry. With its rigorous, elegant proofs, this self-contained work is easy to read, making it suitable for undergraduate and beginning graduate students seeking a deeper understanding of real analysis and applications, and for all those looking for a well-founded, detailed approach to real analysis.

Mathematics and Its History Eamon Dolan Books

The Command to Look was one of William Mortensen's most influential and sought-after books, and has been out of print for fifty years. Reproduced here in full, this book includes an essay by Michael Moynihan on how its images influenced the occult "lesser magic" of the founder of the Church of Satan, Anton Szandor LaVey. The book reproduces fifty-five images of Mortensen's best work and text by the wittiest and most biting writers on photography of their time.

[The Command to Look](#) Princeton University Press

A comprehensive look at four of the most famous problems in mathematics *Tales of Impossibility* recounts the intriguing story of the renowned problems of antiquity, four of the most famous and studied questions in the history of mathematics. First posed by the ancient Greeks, these compass and straightedge problems—squaring the circle, trisecting an angle, doubling the cube, and

inscribing regular polygons in a circle—have served as ever-present muses for mathematicians for more than two millennia. David Richeson follows the trail of these problems to show that ultimately their proofs—which demonstrated the impossibility of solving them using only a compass and straightedge—depended on and resulted in the growth of mathematics. Richeson investigates how celebrated luminaries, including Euclid, Archimedes, Viète, Descartes, Newton, and Gauss, labored to understand these problems and how many major mathematical discoveries were related to their explorations. Although the problems were based in geometry, their resolutions were not, and had to wait until the nineteenth century, when mathematicians had developed the theory of real and complex numbers, analytic geometry, algebra, and calculus. Pierre Wantzel, a little-known mathematician, and Ferdinand von Lindemann, through his work on π , finally determined the problems were impossible to solve. Along the way, Richeson provides entertaining anecdotes connected to the problems, such as how the Indiana state legislature passed a bill setting an incorrect value for π and how Leonardo da Vinci made elegant contributions in his own study of these problems. Taking readers from the classical period to the present, *Tales of Impossibility* chronicles how four unsolvable problems have captivated mathematical thinking for centuries.

[Zero](#) Feral House

Recipient of the Mathematical Association of America's Beckenbach Book Prize in 2008! Leonhard Euler was one of the most prolific mathematicians that have ever lived. This book examines the huge scope of mathematical areas explored and developed by Euler, which includes number theory, combinatorics, geometry, complex variables and many more. The information known to Euler over 300 years ago is discussed, and many of his advances are reconstructed. Readers will be left in no doubt about the brilliance and pervasive influence of Euler's work.

[Createspace Independent Pub](#)

This compact, well-written history covers major mathematical ideas and techniques from the ancient Near East to 20th-century computer theory, surveying the works of Archimedes, Pascal, Gauss, Hilbert, and many others. "The author's ability as a first-class historian as well as an able mathematician has enabled him to produce a work which is unquestionably one of the best." — Nature.

A History of the Big Ideas Cambridge University Press

The mathematics of ancient Egypt was fundamentally different from our math today. Contrary to what people might think, it wasn't a primitive forerunner of modern mathematics. In fact, it can't be understood using our current computational methods. *Count Like an Egyptian* provides a fun, hands-on introduction to the intuitive and often-surprising art of ancient Egyptian math. David Reimer guides you step-by-step through addition, subtraction, multiplication, and more. He even shows you how fractions and decimals may have been calculated—they technically didn't exist in the land of the pharaohs. You'll be counting like an Egyptian in no time, and along the way you'll learn firsthand how mathematics is an expression of the culture that uses it, and why there's more to math than rote memorization and bewildering abstraction. Reimer takes you on a lively and entertaining tour of the ancient Egyptian world, providing rich historical details and amusing anecdotes as he presents a host of mathematical problems drawn from different eras of the Egyptian past. Each of these problems is like a tantalizing puzzle, often with a beautiful and elegant solution. As you solve them, you'll be immersed in many facets of Egyptian life, from hieroglyphs and pyramid building to agriculture, religion, and even bread baking and beer brewing. Fully illustrated in color throughout, *Count Like an Egyptian* also teaches you some Babylonian computation—the precursor to our modern system—and compares ancient Egyptian mathematics to today's math, letting you decide for yourself which is better.

The History of the Calculus and Its Conceptual Development Princeton University Press

From one of the greatest minds in contemporary mathematics, Professor E.T. Bell, comes a witty, accessible, and fascinating look at the beautiful craft and enthralling history of mathematics. *Men of*

Mathematics provides a rich account of major mathematical milestones, from the geometry of the Greeks through Newton's calculus, and on to the laws of probability, symbolic logic, and the fourth dimension. Bell breaks down this majestic history of ideas into a series of engrossing biographies of the great mathematicians who made progress possible—and who also led intriguing, complicated, and often surprisingly entertaining lives. Never pedantic or dense, Bell writes with clarity and simplicity to distill great mathematical concepts into their most understandable forms for the curious everyday reader. Anyone with an interest in math may learn from these rich lessons, an advanced degree or extensive research is never necessary.

The Mathematical Universe Princeton University Press

Were it not for the calculus, mathematicians would have no way to describe the acceleration of a motorcycle or the effect of gravity on thrown balls and distant planets, or to prove that a man could cross a room and eventually touch the opposite wall. Just how calculus makes these things possible and in doing so finds a correspondence between real numbers and the real world is the subject of this dazzling book by a writer of extraordinary clarity and stylistic brio. Even as he initiates us into the mysteries of real numbers, functions, and limits, Berlinski explores the furthest implications of his subject, revealing how the calculus reconciles the precision of numbers with the fluidity of the changing universe. "An odd and tantalizing book by a writer who takes immense pleasure in this great mathematical tool, and tries to create it in others."--New York Times Book Review

From Archimedes to Newton to Its Role in Science The Calculus Gallery Masterpieces from Newton to Lebesgue

How math holds the keys to improving one's health, wealth, and love life What's the best diet for overall health and weight management? How can we change our finances to retire earlier? How can we maximize our chances of finding our soul mate? In *The Calculus of Happiness*, Oscar Fernandez shows us that math yields powerful insights into health, wealth, and love. Relying on only high school-level math (precalculus with a dash of calculus), Fernandez uses everyday experiences to provide context for his mathematical insights and guides us through surprising results. Important formulas are linked to a dozen free online interactive calculators on the book's website, allowing one to personalize equations. Every chapter ends with a summary of essential lessons and takeaways, and for advanced math fans, Fernandez includes the mathematical derivations in the appendices.

Learning Basic Calculus Princeton University Press

Fun math puzzles based on the Twelve Labors of Hercules How might Hercules, the most famous of the Greek heroes, have used mathematics to complete his astonishing Twelve Labors? From conquering the Nemean Lion and cleaning out the Augean Stables, to capturing the Erymanthean Boar and entering the Underworld to defeat the three-headed dog Cerberus, Hercules and his legend are the inspiration for this book of fun and original math puzzles. While Hercules relied on superhuman strength to accomplish the Twelve Labors, Mythematics shows how math could have helped during his quest. How does Hercules defeat the Lernean Hydra and stop its heads from multiplying? Can Hercules clean the Augean Stables in a day? What is the probability that the Cretan Bull will attack the citizens of Marathon? How does Hercules deal with the terrifying Kraken? Michael Huber's inventive math problems are accompanied by short descriptions of the Twelve Labors, taken from the writings of Apollodorus, who chronicled the life of Hercules two thousand years ago. Tasks are approached from a mathematical modeling viewpoint, requiring varying levels of knowledge, from basic logic and geometry to differential and integral calculus. Mythematics provides helpful hints and complete solutions, and the appendixes include a brief history of the Hercules tale, a review of mathematics and equations, and a guide to the various disciplines of math used throughout the book. An engaging combination of ancient mythology and modern mathematics, Mythematics will enlighten and delight mathematics and classics enthusiasts alike.

How to Read Historical Mathematics Princeton University Press

This book, written primarily for the young adult reader, tells the life story of Emmy Noether, the most important female mathematician of our time. Because no one expected her to grow into an important scientist, the records of her early life are sketchy. After all, it was assumed that she would grow up to be a wife and mother. Instead, she was a g

How a Mathematical Approach to Life Adds Up to Health, Wealth, and Love Springer Nature

Many of the best researchers and writers in discrete mathematics come together in a volume inspired by Ron Graham.

Emmy Noether Princeton University Press

How our understanding of calculus has evolved over more than three centuries, how this has shaped the way it is taught in the classroom, and why calculus pedagogy needs to change *Calculus Reordered* takes readers on a remarkable journey through hundreds of years to tell the story of how calculus evolved into the subject we know today. David Bressoud explains why calculus is credited to seventeenth-century figures Isaac Newton and Gottfried Leibniz, and how its current structure is based on developments that arose in the nineteenth century. Bressoud argues that a pedagogy informed by the historical development of calculus represents a sounder way for students to learn this fascinating area of mathematics. Delving into calculus's birth in the Hellenistic Eastern Mediterranean—particularly in Syracuse, Sicily and Alexandria, Egypt—as well as India and the Islamic Middle East, Bressoud considers how calculus developed in response to essential questions emerging from engineering and astronomy. He looks at how Newton and Leibniz built their work on a flurry of activity that occurred throughout Europe, and how Italian philosophers such as Galileo Galilei played a particularly important role. In describing calculus's evolution, Bressoud reveals problems with the standard ordering of its curriculum: limits, differentiation, integration, and series. He contends that the historical order—integration as accumulation, then differentiation as ratios of change, series as sequences of partial sums, and finally limits as they arise from the algebra of inequalities—makes more sense in the classroom environment. Exploring the motivations behind calculus's discovery, *Calculus Reordered* highlights how this essential tool of mathematics came to be.

Elements of Algebra American Mathematical Soc.

"This textbook is intended for a year-long graduate course on complex analysis, a branch of mathematical analysis that has broad applications, particularly in physics, engineering, and applied mathematics. Based on nearly twenty years of classroom lectures, the book is accessible enough for independent study, while the rigorous approach will appeal to more experienced readers and

scholars, propelling further research in this field. While other graduate-level complex analysis textbooks do exist, Zakeri takes a distinctive approach by highlighting the geometric properties and topological underpinnings of this area. Zakeri includes more than three hundred and fifty problems, with problem sets at the end of each chapter, along with additional solved examples. Background knowledge of undergraduate analysis and topology is needed, but the thoughtful examples are accessible to beginning graduate students and advanced undergraduates. At the same time, the book has sufficient depth for advanced readers to enhance their own research. The textbook is well-written, clearly illustrated, and peppered with historical information, making it approachable without sacrificing rigor. It is poised to be a valuable textbook for graduate students, filling a needed gap by way of its level and unique approach"--

The Calculus of Friendship Princeton University Press

This textbook provides a unified and concise exploration of undergraduate mathematics by approaching the subject through its history. Readers will discover the rich tapestry of ideas behind familiar topics from the undergraduate curriculum, such as calculus, algebra, topology, and more. Featuring historical episodes ranging from the Ancient Greeks to Fermat and Descartes, this volume offers a glimpse into the broader context in which these ideas developed, revealing unexpected connections that make this ideal for a senior capstone course. The presentation of previous versions has been refined by omitting the less mainstream topics and inserting new connecting material, allowing instructors to cover the book in a one-semester course. This condensed edition prioritizes succinctness and cohesiveness, and there is a greater emphasis on visual clarity, featuring full color images and high quality 3D models. As in previous editions, a wide array of mathematical topics are covered, from geometry to computation; however, biographical sketches have been omitted.

Mathematics and Its History: A Concise Edition is an essential resource for courses or reading programs on the history of mathematics. Knowledge of basic calculus, algebra, geometry, topology, and set theory is assumed. From reviews of previous editions: "Mathematics and Its History is a joy to read. The writing is clear, concise and inviting. The style is very different from a traditional text. I found myself picking it up to read at the expense of my usual late evening thriller or detective novel.... The author has done a wonderful job of tying together the dominant themes of undergraduate mathematics." Richard J. Wilders, MAA, on the Third Edition "The book...is presented in a lively style without unnecessary detail. It is very stimulating and will be appreciated not only by students. Much attention is paid to problems and to the development of mathematics before the end of the nineteenth century.... This book brings to the non-specialist interested in mathematics many interesting results. It can be recommended for seminars and will be enjoyed by the broad mathematical community." European Mathematical Society, on the Second Edition

Count Like an Egyptian Cambridge University Press

A look at how calculus has evolved over hundreds of years and why calculus pedagogy needs to change *Calculus Reordered* tells the remarkable story of how calculus grew over centuries into the subject we know today. David Bressoud explains why calculus is credited to seventeenth-century figures Isaac Newton and Gottfried Leibniz, how it was shaped by Italian philosophers such as Galileo Galilei, and how its current structure sprang from developments in the nineteenth century. Bressoud reveals problems with the standard ordering of its curriculum—limits, differentiation, integration, and series—and he argues that a pedagogy informed by the historical evolution of calculus represents a sounder way for students to learn this fascinating area of mathematics. From calculus's birth in the Hellenistic Eastern Mediterranean, India, and the Islamic Middle East, to its contemporary iteration, *Calculus Reordered* highlights the ways this essential tool of mathematics came to be.

Journey Through Genius Simon and Schuster

The legendary Renaissance math duel that ushered in the modern age of algebra *The Secret Formula* tells the story of two Renaissance mathematicians whose jealousies, intrigues, and contentious debates led to the discovery of a formula for the solution of the cubic equation. Niccolò Tartaglia was a talented and ambitious teacher who possessed a secret formula—the key to unlocking a seemingly unsolvable, two-thousand-year-old mathematical problem. He wrote it down in the form of a poem to prevent other mathematicians from stealing it. Gerolamo Cardano was a physician, gifted scholar, and notorious gambler who would not hesitate to use flattery and even trickery to learn Tartaglia's secret. Set against the backdrop of sixteenth-century Italy, *The Secret Formula* provides new and compelling insights into the peculiarities of Renaissance mathematics while bringing a turbulent and culturally vibrant age to life. It was an era when mathematicians challenged each other in intellectual duels held outdoors before enthusiastic crowds. Success not only enhanced the winner's reputation, but could result in prize money and professional acclaim. After hearing of Tartaglia's spectacular victory in one such contest in Venice, Cardano invited him to Milan, determined to obtain his secret by whatever means necessary. Cardano's intrigues paid off. In 1545, he was the first to publish a general solution of the cubic equation. Tartaglia, eager to take his revenge by establishing his superiority as the most brilliant mathematician of the age, challenged Cardano to the ultimate mathematical duel. A lively and compelling account of genius, betrayal, and all-too-human failings, *The Secret Formula* reveals the epic rivalry behind one of the fundamental ideas of modern algebra.

The Genius of Euler: Reflections on his Life and Work Princeton University Press

Many students have trouble the first time they take a mathematics course in which proofs play a significant role. This new edition of Velleman's successful text will prepare students to make the transition from solving problems to proving theorems by teaching them the techniques needed to read and write proofs. The book begins with the basic concepts of logic and set theory, to familiarize students with the language of mathematics and how it is interpreted. These concepts are used as the basis for a step-by-step breakdown of the most important techniques used in constructing proofs. The author shows how complex proofs are built up from these smaller steps, using detailed 'scratch work' sections to expose the machinery of proofs about the natural numbers, relations, functions, and infinite sets. To give students the opportunity to construct their own proofs, this new edition contains over 200 new exercises, selected solutions, and an introduction to Proof Designer software. No background beyond standard high school mathematics is assumed. This book will be useful to anyone interested in logic and proofs: computer scientists, philosophers, linguists, and of course mathematicians.

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