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KEY=THROUGH - ROWE SHEPPARD

Symmetry

A Mathematical Journey

Harper Collins Symmetry is all around us. Of fundamental significance to the way we interpret the world, this unique, pervasive phenomenon indicates a dynamic relationship between objects. Combining a rich historical narrative with his own personal journey as a mathematician, Marcus du Sautoy takes a unique look into the mathematical mind as he explores deep conjectures about symmetry and brings us face-to-face with the oddball mathematicians, both past and present, who have battled to understand symmetry's elusive qualities.

Finding Moonshine: A Mathematician's Journey Through Symmetry (Text Only)

HarperCollins UK This new ebook from the author of 'The Music of the Primes' combines a personal insight into the mind of a working mathematician with the story of one of the biggest adventures in mathematics: the search for symmetry.

The Creativity Code

Art and Innovation in the Age of AI

Harvard University Press Most books on AI focus on the future of work. But now that algorithms can learn and adapt, does the future of creativity also belong to well-programmed machines? To answer this question, Marcus du Sautoy takes us to the forefront of creative new technologies and offers a more positive and unexpected vision of our future cohabitation with machines.

The Number Mysteries

A Mathematical Odyssey through Everyday Life

St. Martin's Press Every time we download music, take a flight across the Atlantic or talk on our cell phones, we are relying on great mathematical inventions. In The Number Mysteries, one of our generation's foremost mathematicians Marcus du Sautoy offers a playful and accessible examination of numbers and how, despite efforts of the greatest minds, the most fundamental puzzles of nature remain unsolved. Du Sautoy tells about the quest to predict the future—from the flight of asteroids to an impending storm, from bending a ball like Beckham to forecasting population growth. He brings to life the beauty behind five mathematical puzzles that have contributed to our understanding of the world around us and have helped develop the technology to cope with it. With loads of games to play and puzzles to solve, this is a math book for everyone.

The Number Mysteries

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Thinking Better

The Art of the Shortcut in Math and Life

Basic Books One of the world's great mathematicians shows why math is the ultimate timesaver—and how everyone can make their lives easier with a few simple shortcuts. We are often told that hard work is the key to success. But success isn't about hard work – it's about shortcuts. Shortcuts allow us to solve one problem quickly so that we can tackle an even bigger one. They make us capable of doing great things. And according to Marcus du Sautoy, math is the very art of the shortcut. Thinking Better is a celebration of how math lets us do more with less. Du Sautoy explores how diagramming revolutionized therapy, why calculus is the greatest shortcut ever invented, whether you must really practice for ten thousand hours to become a concert violinist, and why shortcuts give us an advantage over even the most powerful AI. Throughout, we meet artists, scientists, and entrepreneurs who use mathematical shortcuts to change the world. Delightful, illuminating, and above all practical, Thinking Better is for anyone who has wondered why you should waste time climbing the mountain when you could go around it much faster.

How to Count to Infinity

Quercus Publishing Do something amazing and learn a new skill thanks to the Little Ways to Live a Big Life books! Birds do it, bees do it, even educated fleas do it... Not falling in love, but counting. Animals and humans have been using numbers to navigate their way through the jungle of life ever since we all evolved on this planet. But this book will help you to do something that humans have only recently understood how to do: to count to regions that no animal has ever reached. By the end of this book you'll be able to count to infinity...and beyond. On our way to infinity we'll discover how the ancient Babylonians used their bodies to count to 60 (which gave us 60 minutes in the hour), how the number zero was only discovered in the 7th century by Indian mathematicians contemplating the void, why in China going into the red meant your numbers had gone negative and why numbers might be our best language for communicating with alien life. But for millennia contemplating infinity has sent even the greatest minds into a spin. Then at the end of the nineteenth century mathematicians discovered a way to think about infinity that revealed that it is a number that we can count. Not only that. They found that there are an infinite number of infinities, some bigger than others. Just using the finite neurons in your brain and the finite pages in this book, you'll have your mind blown discovering the secret of how to count to infinity.

The Great Unknown

Seven Journeys to the Frontiers of Science

Penguin "An engaging voyage into some of the great mysteries and wonders of our world." --Alan Lightman, author of Einstein's Dream and The Accidental Universe "No one is better at making the recondite accessible and exciting." —Bill Bryson Brain Pickings and Kirkus Best Science Book of the Year Every week seems to throw up a new discovery, shaking the foundations of what we know. But are there questions we will never be able to answer—mysteries that lie beyond the predictive powers of science? In this captivating exploration of our most tantalizing unknowns, Marcus du Sautoy invites us to consider the problems in cosmology, quantum physics, mathematics, and neuroscience that continue to bedevil scientists and creative thinkers who are at the forefront of their fields. At once exhilarating, mind-bending, and compulsively readable, The Great Unknown challenges us to consider big questions—about the nature of consciousness, what came before the big bang, and what lies beyond our horizons—while taking us on a virtuoso tour of the great breakthroughs of the past and celebrating the men and women who dared to tackle the seemingly impossible and had the imagination to come up with new ways of seeing the world.

Love and Math

The Heart of Hidden Reality

Basic Books An awesome, globe-spanning, and New York Times best-selling journey through the beauty and power of mathematics What if you had to take an art class in which you were only taught how to paint a fence? What if you were never shown the paintings of van Gogh and Picasso, weren't even told they existed? Alas, this is how math is taught, and so for most of us it becomes the intellectual equivalent of watching paint dry. In Love and Math, renowned mathematician Edward Frenkel reveals a side of math we've never seen, suffused with all the beauty and elegance of a work of art. In this heartfelt and passionate book, Frenkel shows that mathematics, far from occupying a specialist niche, goes to the heart of all matter, uniting us across cultures, time, and space. Love and Math tells two intertwined stories: of the wonders of mathematics and of one young man's journey learning and living it. Having braved a discriminatory educational system to become one of the twenty-first century's leading mathematicians, Frenkel now works on one of the biggest ideas to come out of math in the last 50 years: the Langlands Program. Considered by many to be a Grand Unified Theory of mathematics, the Langlands Program enables researchers to translate findings from one field to another so that they can solve problems, such as Fermat's last theorem, that had seemed intractable before. At its core, Love and Math is a story about accessing a new way of thinking, which can enrich our lives and empower us to better understand the world and our place in it. It is an invitation to discover the magic hidden universe of mathematics.

The Mathematics of Love

Patterns, Proofs, and the Search for the Ultimate Equation

Simon and Schuster In this must-have for anyone who wants to better understand their love life, a mathematician pulls back the curtain and reveals the hidden patterns—from dating sites to divorce, sex to marriage—behind the rituals of love. The roller coaster of romance is hard to quantify; defining how lovers might feel from a set of simple equations is impossible. But that doesn't mean that mathematics isn't a crucial tool for understanding love. Love, like most things in life, is full of patterns. And mathematics is ultimately the study of patterns—from predicting the weather to the fluctuations of the stock market, the movement of planets or the growth of cities. These patterns twist and turn and warp and evolve just as the rituals of love do. In The Mathematics of Love, Dr. Hannah Fry takes the reader on a fascinating journey through the patterns that define our love lives, applying mathematical formulas to the most common yet complex questions pertaining to love: What's the chance of finding love? What's the probability that it will last? How do online dating algorithms work, exactly? Can game theory help us decide who to approach in a bar? At what point in your dating life should you settle down? From evaluating the best strategies for online dating to defining the nebulous concept of beauty, Dr. Fry proves—with great insight, wit, and fun—that math is a surprisingly useful tool to negotiate the complicated, often baffling, sometimes infuriating, always interesting, mysteries of love.

A Mathematical Medley

Fifty Easy Pieces on Mathematics

American Mathematical Soc. Szpiro's book provides a delightful, well-written, eclectic selection of mathematical tidbits that makes excellent airplane reading for anyone with an interest in mathematics, regardless of their mathematical background. Excellent gift material. --Keith Devlin, Stanford University, author of The Unfinished Game and The Language of Mathematics It is great to have collected in one volume the many varied, insightful and often surprising mathematical stories that George Szpiro has written in his mathematical columns for the newspapers through the years. --Marcus du Sautoy, Oxford University, author of The Music of the Primes and Symmetry: A Journey into the Patterns of Nature Mathematics is thriving. Not only have long-standing problems, such as the Poincare conjecture, been solved, but mathematics is an important element of many modern conveniences, such as cell phones, CDs, and secure transactions over the Internet. For good or for bad, it is also the engine that drives modern investment strategies. Fortunately for the general public, mathematics and its modern applications can be intelligible to the non-specialist, as George Szpiro shows in A Mathematical Medley. In stories of a few pages each, Szpiro describes in layman's terms mathematical problems that have recently been solved (or thought to have been solved), research that was published in scientific journals, and mathematical observations about contemporary life. Anecdotal stories about the lives of mathematicians and stories about famous old problems are interspersed among other vignettes.

Birth of a Theorem

A Mathematical Adventure

Farrar, Straus and Giroux In 2010, French mathematician Cédric Villani received the Fields Medal, the most coveted prize in mathematics, in recognition of a proof which he devised with his close collaborator Clément Mouhot to explain one of the most surprising theories in classical physics. Birth of a Theorem is Villani's own account of the years leading up to the award. It invites readers inside the mind of a great mathematician as he wrestles with the most important work of his career. But you don't have to understand nonlinear Landau damping to love Birth of a Theorem. It doesn't simplify or overexplain; rather, it invites readers into collaboration. Villani's diaries, emails, and musings enmesh you in the process of discovery. You join him in unproductive lulls and late-night breakthroughs. You're privy to the dining-hall conversations at the world's greatest research institutions. Villani shares his favorite songs, his love of manga, and the imaginative stories he tells his children. In mathematics, as in any creative work, it is the thinker's whole life that propels discovery—and with Birth of a Theorem, Cédric Villani welcomes you into his.

What We Cannot Know

Fourth Estate Science is king. Every week, headlines announce new breakthroughs in our understanding of the universe, new technologies that will transform our environment, new medical advances that will extend our lives. Science is giving us unprecedented insight into some of the big questions that have challenged humanity ever since we've been able to formulate those questions. Where did we come from? What is the ultimate destiny of the universe? What are the building blocks of the physical world? What is consciousness? This book asks us to rein in this unbridled enthusiasm for the power of science. Marcus du Sautoy explores the limits of human knowledge, to probe whether there is anything we truly cannot know

I is a Strange Loop

Faber & Faber Alone in a cube that's glowing in the darkness, X is content within its little universe of infinite thought. This solitude is disturbed by the appearance of Y, who insists on exposing X to the richness of the physical world. Each begins to long for what the other has, luring them into a strange loop. In this play for two variables, Marcus du Sautoy and Victoria Gould use mathematics and theatre to navigate the furthest reaches of our world. Through a series of surreal episodes, X and Y tackle some of life's greatest questions: where did the universe come from, does time have an end, do we have free will? I is a Strange Loop was first performed by the authors at the Barbican Pit, London, in March 2019. 'I is a Strange Loop is a play that plays... with ideas, concepts, abstractions and relationships that are, usually, hidden from the sight of ordinary mortals, articulating the ineffable, incarnating the incorporeal, revealing the inconceivable... it makes us feel we know a great deal more than we do....

and is also very funny, utterly compelling and marvellously human.' Simon McBurney

The Math Gene

How Mathematical Thinking Evolved And Why Numbers Are Like Gossip

Basic Books Why is math so hard? And why, despite this difficulty, are some people so good at it? If there's some inborn capacity for mathematical thinking—which there must be, otherwise no one could do it —why can't we all do it well? Keith Devlin has answers to all these difficult questions, and in giving them shows us how mathematical ability evolved, why it's a part of language ability, and how we can make better use of this innate talent.He also offers a breathtakingly new theory of language development—that language evolved in two stages, and its main purpose was not communication—to show that the ability to think mathematically arose out of the same symbol-manipulating ability that was so crucial to the emergence of true language. Why, then, can't we do math as well as we can speak? The answer, says Devlin, is that we can and do—we just don't recognize when we're using mathematical reasoning.

The Outer Limits of Reason

What Science, Mathematics, and Logic Cannot Tell Us

MIT Press An exploration of the scientific limits of knowledge that challenges our deep-seated beliefs about our universe, our rationality, and ourselves. Many books explain what is known about the universe. This book investigates what cannot be known. Rather than exploring the amazing facts that science, mathematics, and reason have revealed to us, this work studies what science, mathematics, and reason tell us cannot be revealed. In The Outer Limits of Reason, Noson Yanofsky considers what cannot be predicted, described, or known, and what will never be understood. He discusses the limitations of computers, physics, logic, and our own thought processes. Yanofsky describes simple tasks that would take computers trillions of centuries to complete and other problems that computers can never solve; perfectly formed English sentences that make no sense; different levels of infinity; the bizarre world of the quantum; the relevance of relativity theory; the causes of chaos theory; math problems that cannot be solved by normal means; and statements that are true but cannot be proven. He explains the limitations of our intuitions about the world—our ideas about space, time, and motion, and the complex relationship between the knower and the known. Moving from the concrete to the abstract, from problems of everyday language to straightforward philosophical questions to the formalities of physics and mathematics, Yanofsky demonstrates a myriad of unsolvable problems and paradoxes. Exploring the various limitations of our knowledge, he shows that many of these limitations have a similar pattern and that by investigating these patterns, we can better understand the structure and limitations of reason itself. Yanofsky even attempts to look beyond the borders of reason to see what, if anything, is out there.

The Music of the Primes

Searching to Solve the Greatest Mystery in Mathematics

Harper Collins An examination of the Riemann Hypothesis considers the modern implications of its solution, noting its potential impact on business, science, and other fields and describing the million-dollar prize currently being offered to whomever can crack its code. Reprint.

How Not to Be Wrong

The Power of Mathematical Thinking

Penguin "Witty, compelling, and just plain fun to read . . ." —Evelyn Lamb, Scientific American The Freakonomics of math—a math-world superstar unveils the hidden beauty and logic of the world and puts its power in our hands The math we learn in school can seem like a dull set of rules, laid down by the ancients and not to be questioned. In How Not to Be Wrong, Jordan Ellenberg shows us how terribly limiting this view is: Math isn't confined to abstract incidents that never occur in real life, but rather touches everything we do—the whole world is shot through with it. Math allows us to see the hidden structures underneath the messy and chaotic surface of our world. It's a science of not being wrong, hammered out by centuries of hard work and argument. Armed with the tools of mathematics, we can see through to the true meaning of information we take for granted: How early should you get to the airport? What does "public opinion" really represent? Why do tall parents have shorter children? Who really won Florida in 2000? And how likely are you, really, to develop cancer? How Not to Be Wrong presents the surprising revelations behind all of these questions and many more, using the mathematician's method of analyzing life and exposing the hard-won insights of the academic community to the layman—minus the jargon. Ellenberg chases mathematical threads through a vast range of time and space, from the everyday to the cosmic, encountering, among other things, baseball, Reaganomics, daring lottery schemes, Voltaire, the replicability crisis in psychology, Italian Renaissance painting, artificial languages, the development of non-Euclidean geometry, the coming obesity apocalypse, Antonin Scalia's views on crime and punishment, the psychology of slime molds, what Facebook can and can't figure out about you, and the existence of God. Ellenberg pulls from history as well as from the latest theoretical developments to provide those not trained in math with the knowledge they need. Math, as Ellenberg says, is "an atomic-powered prosthesis that you attach to your common sense, vastly multiplying its reach and strength." With the tools of mathematics in hand, you can understand the world in a deeper, more meaningful way. How Not to Be Wrong will show you how.

Symmetry

A Mathematical Exploration

Springer Nature This textbook is perfect for a math course for non-math majors, with the goal of encouraging effective analytical thinking and exposing students to elegant mathematical ideas. It includes many topics commonly found in sampler courses, like Platonic solids, Euler's formula, irrational numbers, countable sets, permutations, and a proof of the Pythagorean Theorem. All of these topics serve a single compelling goal: understanding the mathematical patterns underlying the symmetry that we observe in the physical world around us. The exposition is engaging, precise and rigorous. The theorems are visually motivated with intuitive proofs appropriate for the intended audience. Students from all majors will enjoy the many beautiful topics herein, and will come to better appreciate the powerful cumulative nature of mathematics as these topics are woven together into a single fascinating story about the ways in which objects can be symmetric.

The Penguin Dictionary of Mathematics

Fourth edition

Penguin UK The Penguin Dictionary of Mathematics takes in all branches of pure and applied mathematics, from algebra to mechanics and from number theory to statistics. Invaluable for students at all levels, it is also a useful and versatile source book for economists, business people, engineers, technicians and scientists of all kinds who use mathematics in the course of their work.

The Two Cultures: Shared Problems

Springer Science & Business Media The aim of the book is to encourage an in-depth discussion of problems of fundamental importance that are common to the two cultures, but that are traditionally seen from different perspectives. The forum will bring together scientists, philosophers, humanists, musicians with the aim of fostering comprehension of problems that have traditionally troubled humankind, and establish more fertile grounds for the communication between the two cultures. The themes of the contributions are the followings: the concept of time, infinity, the concept and meaning of nothingness, numbers, intelligence and the human mind, basic mechanisms in the production of thought and of artistic creation, the relationship between artistic and scientific creativity.

Why Beauty Is Truth

A History of Symmetry

Physics.

How Math Explains the World

A Guide to the Power of Numbers, from Car Repair to Modern Physics

Harper Collins In How Math Explains the World, mathematician Stein reveals how seemingly arcane mathematical investigations and discoveries have led to bigger, more world-shaking insights into the nature of our world. In the four main sections of the book, Stein tells the stories of the mathematical thinkers who discerned some of the most fundamental aspects of our universe. From their successes and failures, delusions, and even duels, the trajectories of their innovations—and their impact on society—are traced in this fascinating narrative. Quantum mechanics, space-time, chaos theory and the workings of complex systems, and the impossibility of a "perfect" democracy are all here. Stein's book is both mind-bending and practical, as he explains the best way for a salesman to plan a trip, examines why any thought you could have is imbedded in the number p , and—perhaps most importantly—answers one of the modern world's toughest questions: why the garage can never get your car repaired on time. Friendly, entertaining, and fun, How Math Explains the World is the first book by one of California's most popular math teachers, a veteran of both "math for poets" and Princeton's Institute for Advanced Studies. And it's perfect for any reader wanting to know how math makes both science and the world tick.

Divisor Drips and Square Root Waves

Lulu.com A pattern-finding journey through a shimmering universe of large composite numbers, this book starts with a simple graph of divisors and expands it into a vast visual sea of interlocking patterns. Why do mathematicians keep asking if there is any meaning to the sequence of prime numbers? Just think of the primes as the negative spaces behind overlapping composite patterns. The chaotic sequence of primes that pass through the Sieve of Eratosthenes is far less interesting than the Sieve itself! Did you know that the numbers in the range of nine quintillion have a hidden pattern (nested parabolas, reflection rays, swirling proto-galaxies)? These images could not have been seen before the computer allowed us to peer into the dense fabric of numbers. This book will inspire math educators, visual thinkers, and pattern lovers.

Mathematicians of the World, Unite!

The International Congress of Mathematicians--A Human Endeavor

CRC Press This vividly illustrated history of the International Congress of Mathematicians — a meeting of mathematicians from around the world held roughly every four years — acts as a visual history of the 25 congresses held between 1897 and 2006, as well as a story of changes in the culture of mathematics over the past century. Because the congress is an international meeting, looking at its history allows us a glimpse into the effect of wars and strained relations between nations on the scientific community.

No Bullshit Guide to Linear Algebra

This textbook covers the material for an undergraduate linear algebra course: vectors, matrices, linear transformations, computational techniques, geometric constructions, and theoretical foundations. The explanations are given in an informal conversational tone. The book also contains 100+ problems and exercises with answers and solutions. A special feature of this textbook is the prerequisites chapter that covers topics from high school math, which are necessary for learning linear algebra. The presence of this chapter makes the book suitable for beginners and the general audience-readers

need not be math experts to read this book. Another unique aspect of the book are the applications chapters (Ch 7, 8, and 9) that discuss applications of linear algebra to engineering, computer science, economics, chemistry, machine learning, and even quantum mechanics.

1089 and All that

A Journey Into Mathematics

Oxford University Press, USA This excellent book, written by the established author David Acheson, makes mathematics accessible to everyone. Providing an entertaining and witty overview of the subject, the text includes several fascinating puzzles, and is accompanied by numerous illustrations and sketches by world famouscartoonists. This unusual book is one of the most readable explanations of mathematics available.

The Great Unknown Deluxe

Seven Journeys to the Frontiers of Science

Penguin "An engaging voyage into some of the great mysteries and wonders of our world." --Alan Lightman, author of Einstein's Dream and The Accidental Universe "No one is better at making the recondite accessible and exciting." —Bill Bryson Brain Pickings and Kirkus Best Science Book of the Year Every week seems to throw up a new discovery, shaking the foundations of what we know. But are there questions we will never be able to answer—mysteries that lie beyond the predictive powers of science? In this captivating exploration of our most tantalizing unknowns, Marcus du Sautoy invites us to consider the problems in cosmology, quantum physics, mathematics, and neuroscience that continue to bedevil scientists and creative thinkers who are at the forefront of their fields. At once exhilarating, mind-bending, and compulsively readable, The Great Unknown challenges us to consider big questions—about the nature of consciousness, what came before the big bang, and what lies beyond our horizons—while taking us on a virtuoso tour of the great breakthroughs of the past and celebrating the men and women who dared to tackle the seemingly impossible and had the imagination to come up with new ways of seeing the world.

Enlightening Symbols

A Short History of Mathematical Notation and Its Hidden Powers

Princeton University Press An entertaining look at the origins of mathematical symbols While all of us regularly use basic math symbols such as those for plus, minus, and equals, few of us know that many of these symbols weren't available before the sixteenth century. What did mathematicians rely on for their work before then? And how did mathematical notations evolve into what we know today? In Enlightening Symbols, popular math writer Joseph Mazur explains the fascinating history behind the development of our mathematical notation system. He shows how symbols were used initially, how one symbol replaced another over time, and how written math was conveyed before and after symbols became widely adopted. Traversing mathematical history and the foundations of numerals in different cultures, Mazur looks at how historians have disagreed over the origins of the numerical system for the past two centuries. He follows the transfigurations of algebra from a rhetorical style to a symbolic one, demonstrating that most algebra before the sixteenth century was written in prose or in verse employing the written names of numerals. Mazur also investigates the subconscious and psychological effects that mathematical symbols have had on mathematical thought, moods, meaning, communication, and comprehension. He considers how these symbols influence us (through similarity, association, identity, resemblance, and repeated imagery), how they lead to new ideas by subconscious associations, how they make connections between experience and the unknown, and how they contribute to the communication of basic mathematics. From words to abbreviations to symbols, this book shows how math evolved to the familiar forms we use today.

Count Us In

How to Make Maths Real for All of Us

University of Wales Press Mathematics, like language, is a universal experience. Every society counts and is empowered by its ability to count and to measure. The mathematical processes developed within various cultures differ widely, and Count Us In explores these cultural links, drawing examples from the author's personal experiences. The process of counting, like the process of communicating with words, is common to all societies worldwide but, just as there is a rich variety of languages, so too is there a rich variety in methods of counting and of recording numbers – methods that have developed over centuries to meet the needs of various groups of people. The narrative of this book takes the form of a collection of short stories based on the author's personal experience, linked together by a number of sub-themes. As a popular book on mathematics and on the personalities who created that mathematics, there are no prerequisites beyond the reader's rudimentary and possibly hazy recollection of primary-school mathematics and a curiosity to know more.

Knowledge and Computing

A Course on Computer Epistemology

Central European University Press A unique book about the relations of computation to its mathematical basics and application models. The evolutionary interpretation of these developments creates a novel understanding of compulational design and control processes The analysis focuses on the pitfalls of transformations from the verbal-physical problem formulation to the final execution activities via mathematical modeling and programming. The book is enlightened with witty cartoons, and is based on a general under graduate level knowledge for anybody interested in the subject. An appropriate course material for introduction to philosphy of science, especially epistemology.

Fearless Symmetry

Exposing the Hidden Patterns of Numbers (New Edition)

Princeton University Press Mathematicians solve equations, or try to. But sometimes the solutions are not as interesting as the beautiful symmetric patterns that lead to them. Written in a friendly style for a general audience, Fearless Symmetry is the first popular math book to discuss these elegant and mysterious patterns and the ingenious techniques mathematicians use to uncover them. Hidden symmetries were first discovered nearly two hundred years ago by French mathematician évariste Galois. They have been used extensively in the oldest and largest branch of mathematics--number theory--for such diverse applications as acoustics, radar, and codes and ciphers. They have also been employed in the study of Fibonacci numbers and to attack well-known problems such as Fermat's Last Theorem, Pythagorean Triples, and the ever-elusive Riemann Hypothesis. Mathematicians are still devising techniques for teasing out these mysterious patterns, and their uses are limited only by the imagination. The first popular book to address representation theory and reciprocity laws, Fearless Symmetry focuses on how mathematicians solve equations and prove theorems. It discusses rules of math and why they are just as important as those in any games one might play. The book starts with basic properties of integers and permutations and reaches current research in number theory. Along the way, it takes delightful historical and philosophical digressions. Required reading for all math buffs, the book will appeal to anyone curious about popular mathematics and its myriad contributions to everyday life.

The Best Writing on Mathematics 2011

Princeton University Press The year's finest writing on mathematics from around the world This anthology brings together the year's finest mathematics writing from around the world. Featuring promising new voices alongside some of the foremost names in the field, The Best Writing on Mathematics 2011 makes available to a wide audience many articles not easily found anywhere else—and you don't

need to be a mathematician to enjoy them. These writings offer surprising insights into the nature, meaning, and practice of mathematics today. They delve into the history, philosophy, teaching, and everyday occurrences of math, and take readers behind the scenes of today's hottest mathematical debates. Here Ian Hacking discusses the salient features that distinguish mathematics from other disciplines of the mind; Doris Schattschneider identifies some of the mathematical inspirations of M. C. Escher's art; Jordan Ellenberg describes compressed sensing, a mathematical field that is reshaping the way people use large sets of data; Erica Klarreich reports on the use of algorithms in the job market for doctors; and much, much more. In addition to presenting the year's most memorable writings on mathematics, this must-have anthology includes a foreword by esteemed physicist and mathematician Freeman Dyson. This book belongs on the shelf of anyone interested in where math has taken us—and where it is headed.

Metaphysics and Grammar

A&C Black A study of the relation of metaphysics to grammar, placing the central topics of philosophy in an entirely new light.

New Horizons in pro-p Groups

Springer Science & Business Media The impetus for current research in pro-p groups comes from four main directions: from new applications in number theory, which continue to be a source of deep and challenging problems; from the traditional problem of classifying finite p-groups; from questions arising in infinite group theory; and finally, from the younger subject of 'profinite group theory'. A correspondingly diverse range of mathematical techniques is being successfully applied, leading to new results and pointing to exciting new directions of research. In this work important theoretical developments are carefully presented by leading mathematicians in the field, bringing the reader to the cutting edge of current research. With a systematic emphasis on the construction and examination of many classes of examples, the book presents a clear picture of the rich universe of pro-p groups, in its unity and diversity. Thirty open problems are discussed in the appendix. For graduate students and researchers in group theory, number theory, and algebra, this work will be an indispensable reference text and a rich source of promising avenues for further exploration.

Teaching Mathematics Creatively

Routledge This revised and updated third edition offers a range of strategies, activities and ideas to bring mathematics to life in the primary classroom. Taking an innovative and playful approach to maths teaching, this book promotes creativity as a key element of practice and offers ideas to help your students develop knowledge, understanding and enjoyment of the subject. In the creative classroom, mathematics becomes a tool to build confidence, develop problem solving skills and motivate children. The fresh approaches explored in this book include a range of activities such as storytelling, music and construction, elevating maths learning beyond subject knowledge itself to enable students to see mathematics in a new way. Key chapters of this book explore: • Learning maths outdoors - make more noise, make more mess or work on a larger scale • Everyday maths - making sense of the numbers, patterns, shapes and measures children see around them • Music and maths – the role of rhythm in learning, and music and pattern in maths Stimulating, accessible and underpinned by the latest research and theory, this is essential reading for trainee and practising teachers who wish to embed creative approaches to maths teaching in their classroom.

Uncle Petros and Goldbach's Conjecture

Faber & Faber Uncle Petros is a family joke. An ageing recluse, he lives alone in a suburb of Athens, playing chess and tending to his garden. If you didn't know better, you'd surely think he was one of life's failures. But his young nephew suspects otherwise. For Uncle Petros, he discovers, was once a celebrated mathematician, brilliant and foolhardy enough to stake everything on solving a problem that had defied all attempts at proof for nearly three centuries - Goldbach's Conjecture. His quest brings him into contact with some of the century's greatest mathematicians, including the Indian prodigy Ramanujan and the young Alan Turing. But his struggle is lonely and single-minded, and by the end it has apparently destroyed his life. Until that is a final encounter with his nephew opens up to Petros, once more, the deep mysterious beauty of mathematics. Uncle Petros and Goldbach's Conjecture is an inspiring novel of intellectual adventure, proud genius, the exhilaration of pure mathematics - and the rivalry and antagonism which torment those who pursue impossible goals.

Living by Numbers

In Defence of Quantity

Reaktion Books How do we really think about the world? We may use words to tell stories about it or draw pictures to represent it, but one thing we do far more than either of those is make calculations of the things that are in it—and to do that we use numbers. Numbers give shape and texture to almost everything we feel, say, dream, and do, a fact that Steven Connor explores in this qualitative assessment of the quantifiable. Looking at how numbers play a part in nearly every aspect of our lives, he offers a fascinating portrait of the world as a world of numbers. Connor explores a host of thought-provoking aspects of our numerical existence. He looks at the unexpected oddities that shape the loneliest number—the number one. He looks at counting as a human phenomenon and the ways we negotiate crowds, swarms, and multitudes. He demonstrates the work of calculation as it lies at the heart of poetry, jokes, painting, and music. He shows how we use numbers to adjust to uncertainty and chance and how they help us visualize the world in diagrammatic ways, and he unveils how numbers even help us think about death. Altogether, Connor brings into relief an aspect of our lives so ubiquitous that we often can't see it, unveiling a rich new way of thinking about our existence.

The Accidental Universe

The World You Thought You Knew

Corsair In The Accidental Universe, physicist and novelist Alan Lightman explores the emotional and philosophical questions raised by discoveries in science, focusing most intently on the human condition and the needs of humankind. Here, in a collection of exhilarating essays, Lightman shows us our own universe from a series of fascinating and diverse perspectives. He takes on the difficult dialogue between science and religion; the conflict between our human desire for permanence and the impermanence of nature; the possibility that our universe is simply an accident; the manner in which modern technology has divorced us from enjoying a direct experience of the world; and our resistance to the view that our bodies and minds can be explained by scientific logic and laws alone. With his customary passion, precision, lyricism and imagination, in The Accidental Universe Alan Lightman leaves us with the suggestion - heady and humbling - that what we see and understand of the world and ourselves is only a tiny piece of the extraordinary, perhaps unfathomable whole. Praise for Alan Lightman: '...a gem of a novel that is strange witty erudite and alive with Lightman's playful genius.' Junot Diaz. 'It would not seem possible for Alan Lightman to match his earlier tour de force, Einstein's Dreams, but in Mr g he has done so - with wit, imagination, and transcendent beauty.' Anita Desai.

Einstein's Dreams

Vintage A modern classic, Einstein's Dreams is a fictional collage of stories dreamed by Albert Einstein in 1905, about time, relativity and physics. As the defiant but sensitive young genius is creating his theory of relativity, a new conception of time, he imagines many possible worlds. In one, time is circular, so that people are fated to repeat triumphs and failures over and over. In another, there is a place where time stands still, visited by lovers and parents clinging to their children. In another, time is a nightingale, sometimes trapped by a bell jar. Now translated into thirty languages, Einstein's Dreams has inspired playwrights, dancers, musicians, and painters all over the world. In poetic vignettes, it explores the connections between science and art, the process of creativity, and ultimately the fragility of human existence.