

Mathematics A Very Short Introduction Timothy Gowers

The History of Mathematics: A Very Short Introduction
Statistics: A Very Short Introduction
A Very Short, Fairly Interesting and Reasonably Cheap Book about Qualitative Research
An Introduction to Mathematics
The Knot Book
Fire: A Very Short Introduction
Infinity: A Very Short Introduction
Algebra
Development
Big Data: a Very Short Introduction
Mathematics: A Very Short Introduction
Basic Category Theory
An Introduction to the Mathematics of Financial Derivatives
Introduction to Topology and Geometry
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Mathematics: A Very Short Introduction
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Reading: A Very Short Introduction
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The Ancient Near East: A Very Short Introduction
Symmetry: A Very Short Introduction
Information: A Very Short Introduction
Combinatorics
Topology
Chemistry: A Very Short Introduction
A Concise Introduction to Pure Mathematics
Logic: A Very Short Introduction
Game Theory: A Very Short Introduction
Probability: A Very Short Introduction
Cryptography: A Very Short Introduction
Trigonometry: a Very Short Introduction
Mathematical Finance
Relativity: A Very Short Introduction
Numbers: A Very Short Introduction

The History of Mathematics: A Very Short Introduction

Modern statistics is very different from the dry and dusty discipline of the popular imagination. In its place is an exciting subject which uses deep theory and powerful software tools to shed light and enable understanding. And it sheds this light on all aspects of our lives, enabling astronomers to explore the origins of the universe, archaeologists to investigate ancient civilisations, governments to understand how to benefit and improve society, and businesses to learn how best to provide goods and services. Aimed at readers with no prior mathematical knowledge, this Very Short Introduction explores and explains how statistics work, and how we can decipher them.

ABOUT THE SERIES: The Very Short Introductions series from Oxford University Press contains hundreds of titles in almost every subject area. These pocket-sized books are the perfect way to get ahead in a new subject quickly. Our expert authors combine facts, analysis, perspective, new ideas, and enthusiasm to make interesting and challenging topics highly readable.

Statistics: A Very Short Introduction

The aim of this book is to explain, carefully but not technically, the differences between advanced, research-level mathematics, and the sort of mathematics we learn at school. The most fundamental differences are philosophical, and readers of this book will emerge with a clearer

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understanding of paradoxical-sounding concepts such as infinity, curved space, and imaginary numbers. The first few chapters are about general aspects of mathematical thought. These are followed by discussions of more specific topics, and the book closes with a chapter answering common sociological questions about the mathematical community (such as "Is it true that mathematicians burn out at the age of 25?")

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A Very Short, Fairly Interesting and Reasonably Cheap Book about Qualitative Research

How is a subway map different from other maps? What makes a knot knotted? What makes the Möbius strip one-sided? These are questions of topology, the mathematical study of properties preserved by twisting or stretching objects. In the 20th century topology became as broad and fundamental as algebra and geometry, with important implications for science, especially physics. In this Very Short Introduction Richard Earl gives a sense of the more visual elements of topology (looking at surfaces) as well as covering the formal definition of continuity. Considering some of the eye-opening examples that

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led mathematicians to recognize a need for studying topology, he pays homage to the historical people, problems, and surprises that have propelled the growth of this field. ABOUT THE SERIES: The Very Short Introductions series from Oxford University Press contains hundreds of titles in almost every subject area. These pocket-sized books are the perfect way to get ahead in a new subject quickly. Our expert authors combine facts, analysis, perspective, new ideas, and enthusiasm to make interesting and challenging topics highly readable.

An Introduction to Mathematics

We live an information-soaked existence - information pours into our lives through television, radio, books, and of course, the Internet. Some say we suffer from 'infoglut'. But what is information? The concept of 'information' is a profound one, rooted in mathematics, central to whole branches of science, yet with implications on every aspect of our everyday lives: DNA provides the information to create us; we learn through the information fed to us; we relate to each other through information transfer - gossip, lectures, reading. Information is not only a mathematically powerful concept, but its critical role in society raises wider ethical issues: who owns information? Who controls its dissemination? Who has access to information? Luciano Floridi, a philosopher of information, cuts across many subjects, from a brief look at the mathematical roots of information - its definition and measurement in 'bits'- to its role in genetics (we are information), and its social meaning

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and value. He ends by considering the ethics of information, including issues of ownership, privacy, and accessibility; copyright and open source. For those unfamiliar with its precise meaning and wide applicability as a philosophical concept, 'information' may seem a bland or mundane topic. Those who have studied some science or philosophy or sociology will already be aware of its centrality and richness. But for all readers, whether from the humanities or sciences, Floridi gives a fascinating and inspirational introduction to this most fundamental of ideas.

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The Knot Book

Games are everywhere: Drivers maneuvering in heavy traffic are playing a driving game. Bargain hunters bidding on eBay are playing an auctioning game. The supermarket's price for corn flakes is decided by playing an economic game. This Very Short Introduction offers a succinct tour of the fascinating world of game theory, a ground-breaking field that analyzes how to play games in a rational way. Ken Binmore, a renowned game theorist, explains the theory in a way that is both entertaining and non-mathematical yet also deeply insightful,

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revealing how game theory can shed light on everything from social gatherings, to ethical decision-making, to successful card-playing strategies, to calculating the sex ratio among bees. With mini-biographies of many fascinating, and occasionally eccentric, founders of the subject--including John Nash, subject of the movie *A Beautiful Mind*--this book offers a concise overview of a cutting-edge field that has seen spectacular successes in evolutionary biology and economics, and is beginning to revolutionize other disciplines from psychology to political science. About the Series: Oxford's Very Short Introductions offers concise and original introductions to a wide range of subjects--from Islam to Sociology, Politics to Classics, and Literary Theory to History. Not simply a textbook of definitions, each volume provides trenchant and provocative--yet always balanced and complete--discussions of the central issues in a given topic. Every Very Short Introduction gives a readable evolution of the subject in question, demonstrating how it has developed and influenced society. Whatever the area of study, whatever the topic that fascinates the reader, the series has a handy and affordable guide that will likely prove indispensable.

Fire: A Very Short Introduction

Infinity is an intriguing topic, with connections to religion, philosophy, metaphysics, logic, and physics as well as mathematics. Its history goes back to ancient times, with especially important contributions from Euclid, Aristotle, Eudoxus, and Archimedes. The

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infinitely large (infinite) is intimately related to the infinitely small (infinitesimal). Cosmologists consider sweeping questions about whether space and time are infinite. Philosophers and mathematicians ranging from Zeno to Russell have posed numerous paradoxes about infinity and infinitesimals. Many vital areas of mathematics rest upon some version of infinity. The most obvious, and the first context in which major new techniques depended on formulating infinite processes, is calculus. But there are many others, for example Fourier analysis and fractals. In this Very Short Introduction, Ian Stewart discusses infinity in mathematics while also drawing in the various other aspects of infinity and explaining some of the major problems and insights arising from this concept. He argues that working with infinity is not just an abstract, intellectual exercise but that it is instead a concept with important practical everyday applications, and considers how mathematicians use infinity and infinitesimals to answer questions or supply techniques that do not appear to involve the infinite. ABOUT THE SERIES: The Very Short Introductions series from Oxford University Press contains hundreds of titles in almost every subject area. These pocket-sized books are the perfect way to get ahead in a new subject quickly. Our expert authors combine facts, analysis, perspective, new ideas, and enthusiasm to make interesting and challenging topics highly readable.

Infinity: A Very Short Introduction

The immune system is central to human health and

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the focus of much medical research. Growing understanding of the immune system, and especially the creation of immune memory (long lasting protection), which can be harnessed in the design of vaccines, have been major breakthroughs in medicine. In this Very Short Introduction, Paul Klenerman describes the immune system, and how it works in health and disease. In particular he focuses on the human immune system, considering how it evolved, the basic rules that govern its behaviour, and the major health threats where it is important. The immune system comprises a series of organs, cells and chemical messengers which work together as a team to provide defence against infection. Klenerman discusses these components, the critical signals that trigger them and how they exert their protective effects, including so-called "innate" immune responses, which react very fast to infection, and "adaptive" immune responses, which have huge diversity and a capacity to recognise and defend against a massive array of micro-organisms. Klenerman also considers what happens when our immune systems fail to be activated effectively, leading to serious infections, problems with inherited diseases, and also HIV/AIDS. At the opposite extreme, as Klenerman shows, an over-exaggerated immune response leads to inflammatory diseases such as Multiple Sclerosis and Rheumatoid Arthritis, as well as allergy and asthma. Finally he looks at the "Immune system v2.0" — how immune therapies and vaccines can be advanced to protect us against the major diseases of the 21st century. ABOUT THE SERIES: The Very Short Introductions series from Oxford University Press contains hundreds of titles in almost every

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subject area. These pocket-sized books are the perfect way to get ahead in a new subject quickly. Our expert authors combine facts, analysis, perspective, new ideas, and enthusiasm to make interesting and challenging topics highly readable.

Algebra

Most people remember chemistry from their schooldays as largely incomprehensible, a subject that was fact-rich but understanding-poor, smelly, and so far removed from the real world of events and pleasures that there seemed little point, except for the most introverted, in coming to terms with its grubby concepts, spells, recipes, and rules. Peter Atkins wants to change all that. In this Very Short Introduction to Chemistry, he encourages us to look at chemistry anew, through a chemist's eyes, in order to understand its central concepts and to see how it contributes not only towards our material comfort, but also to human culture. Atkins shows how chemistry provides the infrastructure of our world, through the chemical industry, the fuels of heating, power generation, and transport, as well as the fabrics of our clothing and furnishings. By considering the remarkable achievements that chemistry has made, and examining its place between both physics and biology, Atkins presents a fascinating, clear, and rigorous exploration of the world of chemistry - its structure, core concepts, and exciting contributions to new cutting-edge technologies. ABOUT THE SERIES: The Very Short Introductions series from Oxford University Press contains hundreds of titles in almost

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every subject area. These pocket-sized books are the perfect way to get ahead in a new subject quickly. Our expert authors combine facts, analysis, perspective, new ideas, and enthusiasm to make interesting and challenging topics highly readable.

Development

Born of the desire to understand the workings of motions of the heavenly bodies, trigonometry gave the ancient Greeks the ability to predict their futures. Most of what we see of the subject in school comes from these heavenly origins; 15th century astronomer Regiomontanus called it "the foot of the ladder to the stars." In this Very Short Introduction Glen Van Brummelen shows how trigonometry connects mathematics to science, and has today become an indispensable tool in predicting cyclic patterns like animal populations and ocean tides. Its historical journey through major cultures such as medieval India and the Islamic World has taken it through disciplines such as geography and even religious practice. Trigonometry has also been a major player in the most startling mathematical developments of the modern world. Its interactions with the concept of infinity led to Taylor and Fourier series, some of the most practical tools of modern science. The birth of complex numbers led to a shocking union of exponential and trigonometric functions, creating the most beautiful formulas and powerful modelling tools in science. Finally, as Van Brummelen shows, trigonometry allows us to explore the strange new worlds of non-Euclidean geometries, opening up

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bizarre possibilities for the shape of space itself. And indeed, one of those new geometries - spherical - takes us full circle back to ancient Greek astronomers and European navigators, who first used it to chart their ways across the heavens and the earth. ABOUT THE SERIES: The Very Short Introductions series from Oxford University Press contains hundreds of titles in almost every subject area. These pocket-sized books are the perfect way to get ahead in a new subject quickly. Our expert authors combine facts, analysis, perspective, new ideas, and enthusiasm to make interesting and challenging topics highly readable.

Big Data: a Very Short Introduction

This Very Short Introduction provides a clear and informative introduction to the science of codebreaking, and its explosive impact on modern society. Taking the reader through the actual processes of developing codes and deciphering them, the book explains what algorithms do, how they are used, the risks associated with using them, and why governments should be concerned. Written in a fluid and lively style to appeal to the non-mathematical reader, this makes for fascinating reading.

Mathematics: A Very Short Introduction

An easily accessible introduction to over three centuries of innovations in geometry Praise for the First Edition “. . . a welcome alternative to compartmentalized treatments bound to the old thinking. This clearly written, well-illustrated book

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supplies sufficient background to be self-contained.”
—CHOICE This fully revised new edition offers the most comprehensive coverage of modern geometry currently available at an introductory level. The book strikes a welcome balance between academic rigor and accessibility, providing a complete and cohesive picture of the science with an unparalleled range of topics. Illustrating modern mathematical topics, *Introduction to Topology and Geometry, Second Edition* discusses introductory topology, algebraic topology, knot theory, the geometry of surfaces, Riemann geometries, fundamental groups, and differential geometry, which opens the doors to a wealth of applications. With its logical, yet flexible, organization, the *Second Edition*:

- Explores historical notes interspersed throughout the exposition to provide readers with a feel for how the mathematical disciplines and theorems came into being
- Provides exercises ranging from routine to challenging, allowing readers at varying levels of study to master the concepts and methods
- Bridges seemingly disparate topics by creating thoughtful and logical connections
- Contains coverage on the elements of polytope theory, which acquaints readers with an exposition of modern theory

Introduction to Topology and Geometry, Second Edition is an excellent introductory text for topology and geometry courses at the upper-undergraduate level. In addition, the book serves as an ideal reference for professionals interested in gaining a deeper understanding of the topic.

Basic Category Theory

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How many possible sudoku puzzles are there? In the lottery, what is the chance that two winning balls have consecutive numbers? Who invented Pascal's triangle? (it was not Pascal) Combinatorics, the branch of mathematics concerned with selecting, arranging, and listing or counting collections of objects, works to answer all these questions. Dating back some 3000 years, and initially consisting mainly of the study of permutations and combinations, its scope has broadened to include topics such as graph theory, partitions of numbers, block designs, design of codes, and latin squares. In this Very Short Introduction Robin Wilson gives an overview of the field and its applications in mathematics and computer theory, considering problems from the shortest routes covering certain stops to the minimum number of colours needed to colour a map with different colours for neighbouring countries. ABOUT THE SERIES: The Very Short Introductions series from Oxford University Press contains hundreds of titles in almost every subject area. These pocket-sized books are the perfect way to get ahead in a new subject quickly. Our expert authors combine facts, analysis, perspective, new ideas, and enthusiasm to make interesting and challenging topics highly readable.

An Introduction to the Mathematics of Financial Derivatives

Now a vital part of modern economies, the rapid growth of the finance industry in recent decades is largely due to the development of mathematical methods such as the theory of arbitrage. Asset

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valuation, credit trading, and fund management, now depend on these mathematical tools. Mark Davis explains the theories and their applications.

Introduction to Topology and Geometry

Logic is often perceived as having little to do with the rest of philosophy, and even less to do with real life. In this lively and accessible introduction, Graham Priest shows how wrong this conception is. He explores the philosophical roots of the subject, explaining how modern formal logic deals with issues ranging from the existence of God and the reality of time to paradoxes of probability and decision theory. Along the way, the basics of formal logic are explained in simple, non-technical terms, showing that logic is a powerful and exciting part of modern philosophy. ABOUT THE SERIES: The Very Short Introductions series from Oxford University Press contains hundreds of titles in almost every subject area. These pocket-sized books are the perfect way to get ahead in a new subject quickly. Our expert authors combine facts, analysis, perspective, new ideas, and enthusiasm to make interesting and challenging topics highly readable.

Astrophysics: A Very Short Introduction

Series Copy The new Very Short Introductions series offers concise and original introductions to a wide range of subjects from politics to classics. Not simply a textbook of definitions, each book in the series provides trenchant, provocative, yet balanced

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discussions on the central issues of the field, gives a readable historical account of the subject, and demonstrates how each particular area of study has developed and shaped society. Eventually, the series will encompass every major academic discipline, offering readers an affordable, accessible, and complete reference library. Stimulating and lively, the Very Short Introductions are indispensable guides and essential reading for anyone interested in the development of these influential fields. Providing the general reader and the student with an introduction to the central issues of political science, *A Very Short Introduction to Politics* shows how political trends and maneuvers develop and how they help shape our society. Kenneth Minogue, with his lively and popular style, begins with a discussion of issues arising from a historical account of politics, and goes on to offer chapters dealing with the Ancient Greeks and the idea of citizenship; Roman law; medieval Christianity and individualism; freedom since Machiavelli and Hobbes; the challenge of ideologies; democracy, oligarchy, and bureaucracy; power and order in modern society; and politics in the West. Readable and pithy, this entertaining introduction is perfect for anyone looking for an accessible overview of the subject.

Newton

Newton's contributions to an understanding of the heavens and the earth are considered to be unparalleled. This very short introduction explains his scientific theories, and uses Newton's unpublished writings to paint a picture of an extremely complex

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man whose beliefs had a huge impact on Europe's political, intellectual, and religious landscape.

Mathematics: A Very Short Introduction

In this Very Short Introduction Peter M. Higgins presents an overview of the number types featured in modern science and mathematics. Providing a non-technical account, he explores the evolution of the modern number system, examines the fascinating role of primes, and explains their role in contemporary cryptography.

The Sun: A Very Short Introduction

Number theory is the branch of mathematics primarily concerned with the counting numbers, especially primes. It dates back to the ancient Greeks, but today it has great practical importance in cryptography, from credit card security to national defence. This book introduces the main areas of number theory, and some of its most interesting problems.

Quantum Theory: A Very Short Introduction

What do we mean by development? How can citizens, governments, and the international community foster development? The process by which nations escape poverty and achieve economic and social progress has been the subject of extensive examination for hundreds of years. The notion of development itself

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has evolved from an original preoccupation with incomes and economic growth to a much broader understanding of development. In this Very Short Introduction Ian Goldin considers the contributions that education, health, gender, equity, and other dimensions of human well-being make to development, and discusses why it is also necessary to include the role of institutions and the rule of law as well as sustainability and environmental concerns. ABOUT THE SERIES: The Very Short Introductions series from Oxford University Press contains hundreds of titles in almost every subject area. These pocket-sized books are the perfect way to get ahead in a new subject quickly. Our expert authors combine facts, analysis, perspective, new ideas, and enthusiasm to make interesting and challenging topics highly readable.

The Immune System: A Very Short Introduction

Mathematics is playing an increasingly important role in society and the sciences, enhancing our ability to use models and handle data. While pure mathematics is mostly interested in abstract structures, applied mathematics sits at the interface between this abstract world and the world in which we live. This area of mathematics takes its nourishment from society and science and, in turn, provides a unified way to understand problems arising in diverse fields. This Very Short Introduction presents a compact yet comprehensive view of the field of applied mathematics, and explores its relationships with

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(pure) mathematics, science, and engineering. Explaining the nature of applied mathematics, Alain Goriely discusses its early achievements in physics and engineering, and its development as a separate field after World War II. Using historical examples, current applications, and challenges, Goriely illustrates the particular role that mathematics plays in the modern sciences today and its far-reaching potential. ABOUT THE SERIES: The Very Short Introductions series from Oxford University Press contains hundreds of titles in almost every subject area. These pocket-sized books are the perfect way to get ahead in a new subject quickly. Our expert authors combine facts, analysis, perspective, new ideas, and enthusiasm to make interesting and challenging topics highly readable.

Reading: A Very Short Introduction

Infinity is an intriguing topic, with connections to religion, philosophy, metaphysics, logic, and physics as well as mathematics. Its history goes back to ancient times, with especially important contributions from Euclid, Aristotle, Eudoxus, and Archimedes. The infinitely large (infinite) is intimately related to the infinitely small (infinitesimal). Cosmologists consider sweeping questions about whether space and time are infinite. Philosophers and mathematicians ranging from Zeno to Russell have posed numerous paradoxes about infinity and infinitesimals. Many vital areas of mathematics rest upon some version of infinity. The most obvious, and the first context in which major new techniques depended on formulating

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infinite processes, is calculus. But there are many others, for example Fourier analysis and fractals. In this Very Short Introduction, Ian Stewart discusses infinity in mathematics while also drawing in the various other aspects of infinity and explaining some of the major problems and insights arising from this concept. He argues that working with infinity is not just an abstract, intellectual exercise but that it is instead a concept with important practical everyday applications, and considers how mathematicians use infinity and infinitesimals to answer questions or supply techniques that do not appear to involve the infinite.

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Applied Mathematics

100 years ago, Einstein's theory of relativity shattered the world of physics. Our comforting Newtonian ideas of space and time were replaced by bizarre and counterintuitive conclusions: if you move at high speed, time slows down, space squashes up and you get heavier; travel fast enough and you could weigh as much as a jumbo jet, be squashed thinner than a CD without feeling a thing - and live for ever. And that was just the Special Theory. With the General Theory came even stranger ideas of curved space-time, and

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changed our understanding of gravity and the cosmos. This authoritative and entertaining Very Short Introduction makes the theory of relativity accessible and understandable. Using very little mathematics, Russell Stannard explains the important concepts of relativity, from $E=mc^2$ to black holes, and explores the theory's impact on science and on our understanding of the universe. ABOUT THE SERIES: The Very Short Introductions series from Oxford University Press contains hundreds of titles in almost every subject area. These pocket-sized books are the perfect way to get ahead in a new subject quickly. Our expert authors combine facts, analysis, perspective, new ideas, and enthusiasm to make interesting and challenging topics highly readable.

Number Theory: a Very Short Introduction

A step-by-step explanation of the mathematical models used to price derivatives. For this second edition, Salih Neftci has expanded one chapter, added six new ones, and inserted chapter-concluding exercises. He does not assume that the reader has a thorough mathematical background. His explanations of financial calculus seek to be simple and perceptive.

Infinity: a Very Short Introduction

A short introduction ideal for students learning category theory for the first time.

Politics: A Very Short Introduction

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This introduction invites readers to revisit algebra and appreciate the elegance and power of equations and inequalities. Offering a clear explanation of algebra through theory and example, Higgins shows how equations lead to complex numbers, matrices, groups, rings, and fields.--

The Ancient Near East: A Very Short Introduction

Examines the history and development of mathematical concepts and how the contemporary student may use them

Symmetry: A Very Short Introduction

Fire is rarely out of the headlines, from large natural wildfires raging across the Australian or Californian countrysides to the burning of buildings such as the disasters of Grenfell tower and Notre Dame. Fire on these scales can represent a serious risk to human life and property. But the advent of fire made and controlled by humans also represented a crucial point in our evolution, allowing us to cook our food, forge our weapons, and warm our homes. This Very Short Introduction covers the fundamentals of fire, whether wild or under human control, starting with the basics of ignition, combustion, and fuel. Andrew Scott considers both natural wildfires and the role of humans in making and suppressing fire. Despite frightening reports of wildfire destruction, he also shows how landscape fires have been part of our planet's history for 400 million years, and do not

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always have to be extinguished. He also considers the problem of fires in urban settings, including new ways to prevent fires. The cost of wildfire can be steep - as well as the burning, post-fire erosion and flooding can have a great impact on both humans and the environment. It can also have a lasting effect in shaping ecosystems and plant life. Scott ends by examining the relationship between fire and the climate, and considering the future of wildfire in a warming world. ABOUT THE SERIES: The Very Short Introductions series from Oxford University Press contains hundreds of titles in almost every subject area. These pocket-sized books are the perfect way to get ahead in a new subject quickly. Our expert authors combine facts, analysis, perspective, new ideas, and enthusiasm to make interesting and challenging topics highly readable.

Information: A Very Short Introduction

Knots are familiar objects. We use them to moor our boats, to wrap our packages, to tie our shoes. Yet the mathematical theory of knots quickly leads to deep results in topology and geometry. The Knot Book is an introduction to this rich theory, starting from our familiar understanding of knots and a bit of college algebra and finishing with exciting topics of current research. The Knot Book is also about the excitement of doing mathematics. Colin Adams engages the reader with fascinating examples, superb figures, and thought-provoking ideas. He also presents the remarkable applications of knot theory to modern chemistry, biology, and physics. This is a compelling

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book that will comfortably escort you into the marvelous world of knot theory. Whether you are a mathematics student, someone working in a related field, or an amateur mathematician, you will find much of interest in *The Knot Book*.

Combinatorics

The ancient Near East is defined, for the purposes of this book, as the cuneiform lands," the regions of the ancient world where the cuneiform script, written on clay tablets, was used as the most common medium for written communication. These lands comprise Mesopotamia (with its variously named regions: Sumer, Akkad, Babylonia, and Assyria); Syria, Elam (later known as Persia), and Anatolia. The three thousand years to be covered by this book - from around 3500 BCE, with the founding of the first Mesopotamian cities (which coincide with the invention of writing) to the conquest of the Near East by the Persian king Cyrus the Great in 539 BCE - encompass an era of remarkable innovation and achievement. Many of the creations of the people of the ancient Near East are still with us, from fundamental inventions such as the wheel and the plow to intellectual feats such as the inventions of astronomy, law, and diplomacy. The region is known as the "cradle of civilization" for good reason. Here, men and women first tried to live peacefully together in densely urban cities, and found ways, through law and custom, to thrive and prosper. The popular image of history as a story of progress from primitive barbarism to modern sophistication is completely

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belied by the study of the ancient Near East. For example, women had many rights and freedoms; they could own property, run businesses, and represent themselves in court. Diplomats traveled between the capital cities of major powers ensuring peace and friendship between the kings. Scribes and scholars studied the stars and could predict eclipses and the movements of the planets. These achievements were lost in subsequent centuries, only to be reborn in more modern times. Perhaps the most obvious legacy from the ancient Near East is seen in some of our units of measurement. The Mesopotamians invented a mathematical system based on the number 60, and all the 60-based units in our modern world (including seconds, minutes, and degrees) have come down, unaltered, directly from Mesopotamia. Taking a chronological view, the book will include what we know, ideas about what we don't yet know (but perhaps will in the future), evidence used for discerning the history of the region, and approaches taken to the evidence by scholars of the ancient Near East. Each chapter will focus on one or two archaeological sites that have contributed extensive evidence (both textual and archaeological) to our understanding of an era and expanding from that evidence to a broader view of the era as a whole."

Topology

The Sun, as our nearest star, is of enormous importance for life on Earth - providing the warm radiation and light which allowed complex life to evolve. The Sun plays a key role in influencing our

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climate, whilst solar storms and high-energy events can threaten our communication infrastructure and satellites. This Very Short Introduction explores what we know about the Sun, its physics, its structure, origins, and future evolution. Philip Judge explains some of the remaining puzzles about the Sun that still confound us, using elementary physics, and mathematical concepts. Why does the Sun form spots? Why does it flare? As he shows, these and other nagging difficulties relate to the Sun's continually variable magnetism, which converts an otherwise dull star into a machine for flooding interplanetary space with variable radiation, high-energy particles and magnetic ejections. Throughout, Judge highlights the many reasons that the Sun is important, and why scientists engage in solar research. ABOUT THE SERIES: The Very Short Introductions series from Oxford University Press contains hundreds of titles in almost every subject area. These pocket-sized books are the perfect way to get ahead in a new subject quickly. Our expert authors combine facts, analysis, perspective, new ideas, and enthusiasm to make interesting and challenging topics highly readable.

Chemistry: A Very Short Introduction

Today many people take reading for granted, but we remain some way off from attaining literacy for the global human population. And whilst we think we know what reading is, it remains in many ways a mysterious process, or set of processes. The effects of reading are myriad: it can be informative, distracting,

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moving, erotically arousing, politically motivating, spiritual, and much, much more. At different times and in different places reading means different things. In this Very Short Introduction Belinda Jack explores the fascinating history of literacy, and the opportunities reading opens. For much of human history reading was the preserve of the elite, and most reading meant being read to. Innovations in printing, paper-making, and transport, combined with the rise of public education from the late eighteenth century on, brought a dramatic rise in literacy in many parts of the world. Established links between a nation's levels of literacy and its economy led to the promotion of reading for political ends. But, equally, reading has been associated with subversive ideas, leading to censorship through multiple channels: denying access to education, controlling publishing, destroying libraries, and even the burning of authors and their works. Indeed, the works of Voltaire were so often burned that an enterprising Parisian publisher produced a fire-proof edition, decorated with a phoenix. But, as Jack demonstrates, reading is a collaborative act between an author and a reader, and one which can never be wholly controlled. Telling the story of reading, from the ancient world to digital reading and restrictions today, Belinda Jack explores why it is such an important aspect of our society.

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readable.

A Concise Introduction to Pure Mathematics

Symmetry is an immensely important concept in mathematics and throughout the sciences. In this Very Short Introduction, Ian Stewart highlights the deep implications of symmetry and its important scientific applications across the entire subject.

Logic: A Very Short Introduction

Astrophysics is the physics of the stars, and more widely the physics of the Universe. It enables us to understand the structure and evolution of planetary systems, stars, galaxies, interstellar gas, and the cosmos as a whole. In this Very Short Introduction, the leading astrophysicist James Binney shows how the field of astrophysics has expanded rapidly in the past century, with vast quantities of data gathered by telescopes exploiting all parts of the electromagnetic spectrum, combined with the rapid advance of computing power, which has allowed increasingly effective mathematical modelling. He illustrates how the application of fundamental principles of physics - the consideration of energy and mass, and momentum - and the two pillars of relativity and quantum mechanics, has provided insights into phenomena ranging from rapidly spinning millisecond pulsars to the collision of giant spiral galaxies. This is a clear, rigorous introduction to astrophysics for those keen to cut their teeth on a conceptual treatment

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Game Theory: A Very Short Introduction

Since long before computers were even thought of, data has been collected and organized by diverse cultures across the world. Once access to the Internet became a reality for large swathes of the world's population, the amount of data generated each day became huge, and continues to grow exponentially. It includes all our uploaded documents, video, and photos, all our social media traffic, our online shopping, even the GPS data from our cars. "Big Data" represents a qualitative change, not simply a quantitative one. The term refers both to the new technologies involved, and to the way it can be used by business and government. Dawn E. Holmes uses a variety of case studies to explain how data is stored, analyzed, and exploited by a variety of bodies from big companies to organizations concerned with disease control. Big data is transforming the way businesses operate, and the way medical research can be carried out. At the same time, it raises important ethical issues; Holmes discusses cases such as the Snowden affair, data security, and domestic smart devices which can be hijacked by hackers.

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The aim of this volume is to explain the differences between research-level mathematics and the maths

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taught at school. Most differences are philosophical and the first few chapters are about general aspects of mathematical thought.

Trigonometry: a Very Short Introduction

Making good decisions under conditions of uncertainty requires an appreciation of the way random chance works. In this Very Short Introduction, John Haigh provides a brief account of probability theory; explaining the philosophical approaches, discussing probability distributions, and looking its applications in science and economics.

Mathematical Finance

In this Very Short Introduction, Jacqueline Stedall explores the rich historical and cultural diversity of mathematical endeavour from the distant past to the present day, using illustrative case studies drawn from a range of times and places; including early imperial China, the medieval Islamic world, and nineteenth-century Britain.

Relativity: A Very Short Introduction

Quantum Theory is the most revolutionary discovery in physics since Newton. This book gives a lucid, exciting, and accessible account of the surprising and counterintuitive ideas that shape our understanding of the sub-atomic world. It does not disguise the problems of interpretation that still remain unsettled 75 years after the initial discoveries. The main text

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makes no use of equations, but there is a Mathematical Appendix for those desiring stronger fare. Uncertainty, probabilistic physics, complementarity, the problematic character of measurement, and decoherence are among the many topics discussed. ABOUT THE SERIES: The Very Short Introductions series from Oxford University Press contains hundreds of titles in almost every subject area. These pocket-sized books are the perfect way to get ahead in a new subject quickly. Our expert authors combine facts, analysis, perspective, new ideas, and enthusiasm to make interesting and challenging topics highly readable.

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Accessible to all students with a sound background in high school mathematics, *A Concise Introduction to Pure Mathematics, Fourth Edition* presents some of the most fundamental and beautiful ideas in pure mathematics. It covers not only standard material but also many interesting topics not usually encountered at this level, such as the theory of solving cubic equations; Euler's formula for the numbers of corners, edges, and faces of a solid object and the five Platonic solids; the use of prime numbers to encode and decode secret information; the theory of how to compare the sizes of two infinite sets; and the rigorous theory of limits and continuous functions. New to the Fourth Edition Two new chapters that serve as an introduction to abstract algebra via the theory of groups, covering abstract reasoning as well as many examples and applications New material on

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inequalities, counting methods, the inclusion-exclusion principle, and Euler's phi function Numerous new exercises, with solutions to the odd-numbered ones Through careful explanations and examples, this popular textbook illustrates the power and beauty of basic mathematical concepts in number theory, discrete mathematics, analysis, and abstract algebra. Written in a rigorous yet accessible style, it continues to provide a robust bridge between high school and higher-level mathematics, enabling students to study more advanced courses in abstract algebra and analysis.

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