
Mathematics A Very Short Introduction Timothy Gowers

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Civil Engineering: A Very Short Introduction Oxford University Press

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.

Cryptography Oxford University Press

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.

Combinatorics Cambridge University Press

Games are everywhere: Drivers manoeuvring in heavy traffic are playing a driving game. Bargain hunters bidding on eBay are playing an auctioning game. A firm negotiating next year's wage is playing a bargaining game. The opposing candidates in an election are playing a political game. The supermarket's price for corn flakes is decided by playing an economic game. Game theory is about how to play such games in a rational way. Even when the players have not thought everything out in advance, game theory often works for the same reason that mindless animals sometimes end up behaving very cleverly: evolutionary forces eliminate irrational play because it is unfit. Game theory has seen spectacular successes in evolutionary biology and economics, and is beginning to revolutionize other disciplines from psychology to political science. This Very Short Introduction introduces the fascinating world of game theory, showing how it can be understood without mathematical equations, and revealing that everything from how to play poker optimally to the sex ratio among bees can be understood by anyone willing to think seriously about the

problem. **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.

Applied Mathematics: A Very Short Introduction Oxford University Press

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

Relativity: A Very Short Introduction OUP Oxford

This book will transform the way you think about design by showing how integral it is to our daily lives, from the spoon we use to eat our breakfast cereal to the medical equipment used to save lives. John Heskett goes beyond style and taste to look at how different cultures and individuals personalise objects.

Leibniz Oxford University Press

Mathematics is a fundamental human activity that can be practised and understood in a multitude of ways; indeed, mathematical ideas themselves are far from being fixed, but are adapted and changed by their passage across periods and cultures. 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. Arranged thematically, to exemplify the varied contexts in which people have learned, used, and handed on mathematics, she also includes illustrative case studies drawn from a range of times and places, including early imperial China, the medieval Islamic world, and nineteenth-century Britain.

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Risk: A Very Short Introduction OUP Oxford

Einstein's theory of relativity shattered the world of physics - replacing Newtonian ideas of space and time with bizarre and counterintuitive conclusions: a world of slowing clocks and stretched space, black holes and curved space-time. This Very Short Introduction explores and explains the theory in an accessible and understandable way.

Numbers Oxford University Press

This Very Short Introduction explores the concept of measurement, its mathematical underpinnings, and its wide range of application from the sciences and social sciences to economics and commerce

Newton Oxford University Press

A fascinating journey through intriguing mathematical and

philosophical territory - a lively introduction to this contemporary topic.

Probability: A Very Short Introduction Oxford University Press
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 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.

Education: A Very Short Introduction OUP Oxford
Number theory is the branch of mathematics that is primarily concerned with the counting numbers. Of particular importance are the prime numbers, the 'building blocks' of our number system. The subject is an old one, dating back over two millennia to the ancient Greeks, and for many years has been studied for its intrinsic beauty and elegance, not least because several of its challenges are so easy to state that everyone can understand them, and yet no-one has ever been able to resolve them. But number theory has also recently become of great practical importance - in the area of cryptography, where the security of your credit card, and indeed of the nation's defence, depends on a result concerning prime numbers that dates back to the 18th century. Recent years have witnessed other spectacular developments, such as Andrew Wiles's proof of 'Fermat's last theorem' (unproved for over 250 years) and some exciting work on prime numbers. In this Very Short Introduction Robin Wilson introduces the main areas of classical number theory, both ancient and modern. Drawing on the work of many of the greatest mathematicians of the past, such as Euclid, Fermat, Euler, and Gauss, he situates some of the most interesting and creative problems in the area in their historical context. 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.

Mathematical Finance OUP Oxford

Many are familiar with the beauty and ubiquity of fractal forms within nature. Unlike the study of smooth forms such as spheres, fractal geometry describes more familiar shapes and patterns, such as the complex contours of coastlines, the outlines of clouds, and the branching of trees. In this Very Short Introduction, Kenneth Falconer looks at the roots of

the 'fractal revolution' that occurred in mathematics in the 20th century, presents the 'new geometry' of fractals, explains the basic concepts, and explores the wide range of applications in science, and in aspects of economics. This is essential introductory reading for students of mathematics and science, and those interested in popular science and mathematics.

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Design: A Very Short Introduction OUP Oxford

This book is a clear and informative introduction to cryptography and data protection - subjects of considerable social and political importance. It explains what algorithms do, how they are used, the risks associated with using them, and why governments should be concerned. Important areas are highlighted, such as Stream Ciphers, block ciphers, public key algorithms, digital signatures, and applications such as e-commerce. This book highlights the explosive impact of cryptography on modern society, with, for example, the evolution of the internet and the introduction of more sophisticated banking methods. 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.

Algebra: A Very Short Introduction Oxford University Press
In the 1800s mathematicians introduced a formal theory of symmetry: group theory. Now a branch of abstract algebra, this subject first arose in the theory of equations. Symmetry is an immensely important concept in mathematics and throughout the sciences, and its applications range across the entire subject. Symmetry governs the structure of crystals, innumerable types of pattern formation, how systems change their state as parameters vary; and fundamental physics is governed by symmetries in the laws of nature. It is highly visual, with applications that include animal markings, locomotion, evolutionary biology, elastic buckling, waves, the shape of the Earth, and the form of galaxies. In this Very Short Introduction, Ian Stewart demonstrates its deep implications, and shows how it plays a major role in the current search to unify relativity and quantum theory. 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.

Measurement Oxford University Press

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

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.

Mathematics: A Very Short Introduction CRC Press

Numbers are integral to our everyday lives and feature in everything we do. In this Very Short Introduction Peter M. Higgins, the renowned mathematics writer, unravels the world of numbers; demonstrating its richness, and providing a comprehensive view of the idea of the number. Higgins paints a picture of the number world, considering how the modern number system matured over centuries. Explaining the various number types and showing how they behave, he introduces key concepts such as integers, fractions, real numbers, and imaginary numbers. By approaching the topic in a non-technical way and emphasising the basic principles and interactions of numbers with mathematics and science, Higgins also demonstrates the practical interactions and modern applications, such as encryption of confidential data on the internet. 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 Oxford University Press

Risks are everywhere. They come from many sources, including crime, diseases, accidents, terror, climate change, finance, and intimacy. They arise from our own acts and they are imposed on us. In this Very Short Introduction Fischhoff and Kadvany draw on both the sciences and humanities to show what all risks have in common. Do we care about losing money, health, reputation, or peace of mind? How much do we care about things happening now or in the future? To ourselves or to others? All risks require thinking hard about what matters to us before we make decisions about them based on past experience, scientific knowledge, and future uncertainties. Using conceptual frameworks such as decision theory and behavioural decision research, we examine the science and practice of creating measures of risk and look at how scientists apply probability by combining historical records, scientific theories, and expert judgement. Showing what science has learned about how people deal with risks, and applying these to diverse everyday examples, the authors demonstrate how we move from understanding a risk to making a choice in everyday life.

Infinity: A Very Short Introduction Oxford University Press

This book provides a fresh modern introduction to geometry, an ancient branch of mathematics with important applications. It takes readers from Euclidean and non-Euclidean geometries, to curved spaces, and the geometry of space-time inside a black hole, and outlines the role geometry plays in the broader context of science and art.

Topology OUP Oxford

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 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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Quantum Theory Oxford University Press, USA

Statistics has evolved into an exciting discipline which uses deep theory and powerful software to shed light on the world around us: from clinical trials in medicine, to economics, sociology, and countless other subjects vital to understanding modern life. This Very Short Introduction explores and explains how statistics works today.