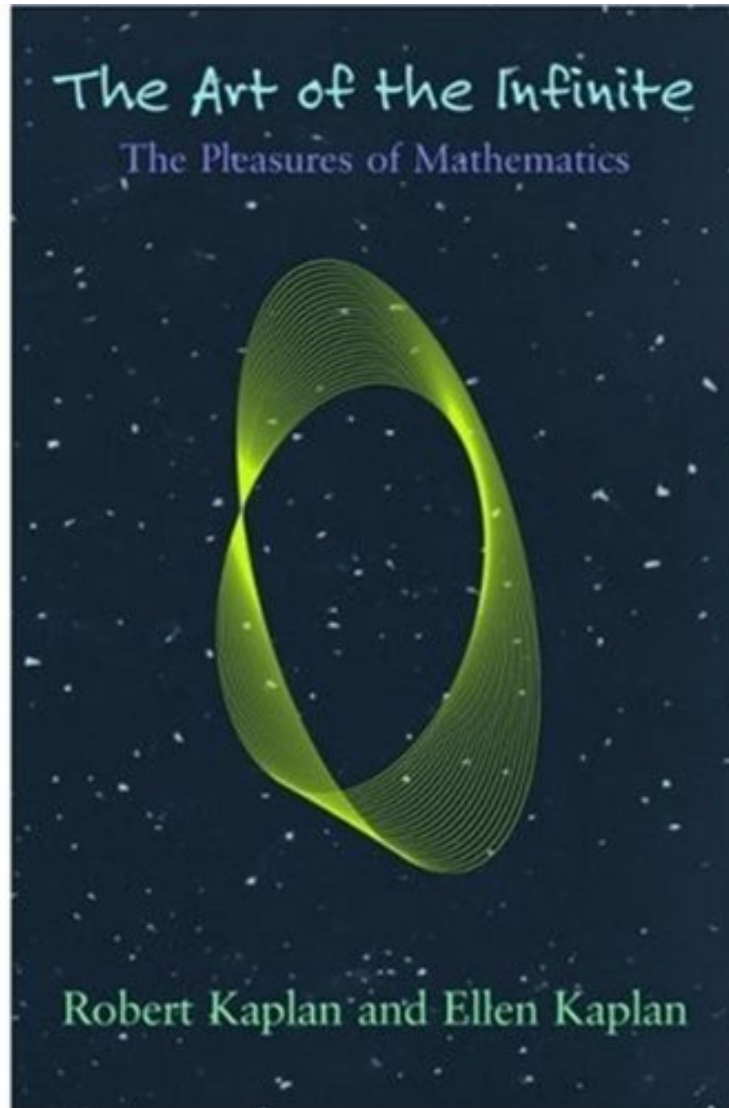


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The Art of the Infinite: The Pleasures of Mathematics

Robert Kaplan, Ellen Kaplan

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Robert Kaplan's *The Nothing That Is: A Natural History of Zero* was an international best-seller, translated into eight languages. *The Times* called it "elegant, discursive, and littered with quotes and allusions from Aquinas via Gershwin to Woolf" and *The Philadelphia Inquirer* praised it as "absolutely scintillating." In this delightful new book, Robert Kaplan, writing together with his wife Ellen Kaplan, once again takes us on a witty, literate, and accessible tour of the world of mathematics. Where *The Nothing That Is* looked at math through the lens of zero, *The Art of the Infinite* takes infinity, in its countless guises, as a touchstone for understanding mathematical thinking. Tracing a path from Pythagoras, whose great Theorem led inexorably to a discovery that his followers tried in vain to keep secret (the existence of irrational numbers); through Descartes and Leibniz; to the brilliant, haunted Georg Cantor, who proved that infinity can come in different sizes, the Kaplans show how the attempt to grasp the ungraspable embodies the essence of mathematics. The Kaplans guide us through the "Republic of Numbers," where we meet both its upstanding citizens and more shadowy dwellers; and we travel across the plane of geometry into the unlikely realm where parallel lines meet. Along the way, deft character studies of great mathematicians (and equally colorful lesser ones) illustrate the opposed yet intertwined modes of mathematical thinking: the intuitionist notion that we discover mathematical truth as it exists, and the formalist belief that math is true because we invent consistent rules for it. "Less than All," wrote William Blake, "cannot satisfy Man." *The Art of the Infinite* shows us some of the ways that Man has grappled with All, and reveals mathematics as one of the most exhilarating expressions of the human imagination.

From Publishers Weekly While Kaplan (*The Nothing That Is: A Natural History of Zero*) and his wife intend this volume to delight the numerophobic into seeing the beauty in math, the "art" they describe is hidden in a thicket of dry proofs. And yet they've written a lovely and erudite history of the subject in spite of that, one that will absorb anyone who already fancies numbers and all their possibilities. Hand-drawn diagrams accompany dense explanatory prose in this exploration of infinity, as the authors chart mathematical discoveries and great thinkers throughout history. Frequent references to luminaries from the humanities (Shakespeare, Baudelaire, Gaudi, Robert Graves) would earn this book comfortable shelving in a liberal arts library if the math weren't so devilishly hard to grasp. (A typical passage compares the way great changes happen in mathematics with the way important figures enter the action in Proust.) The authors acknowledge that even math basics can be tricky: that the product of two negatives is a positive, for instance, is a puzzle that the Kaplans say "put too many people off math forever, convinced that its dicta were arbitrary or spiteful." The authors write that "mathematics is permanent revolution," and indeed, some may find their heads spinning. Nevertheless, a patient reader who loves thinking about thinking will be rewarded by the book's end; by the final pages, he or she will have personally experienced, via these diagrams and problems, many of the great discoveries in mathematics. Graphs and illustrations throughout. Copyright 2003 Reed Business Information, Inc. From School Library Journal Adult/High School-This is mathematics with a plot and characters, as well as diagrams and formulas. In the process of discussing numbers, natural and rational, real and complex, the Kaplans introduce readers to the historical figures who were challenged by their mysteries. The authors explore math in ways that will be new to students whose education has been confined to the classroom. Readers learn not only that a number can be squared, but also that it can be "triangled," and that the sum of two adjacent triangular numbers always makes a square one. The book shows how all the concepts of different types of numbers lead to the notion of infinity, and how one can prove things through geometry that would normally appear to have nothing to do with shapes and lines. Most of the math discussed can be followed by anyone with a smattering of algebra and geometry, and always it is accompanied by stories of how people first discovered the mathematical principles, with illustrations of the protagonists. These accounts vary from tragic to laugh-out-loud funny. Those who love math won't want to miss this one, and those who would like to love it but never have should give the book a try. Paul Brink, Fairfax County Public Library, VA Copyright 2003 Reed Business Information, Inc. From Booklist In contrast to many popular math books that use narrative to produce admiration for a famous mathematician, theorem, or number (as Robert Kaplan did for zero in *The Nothing That Is*, 1999), the Kaplans' new work proposes to inspire readers to actually do math. The authors hope to instill the feeling that arises from inwardly knowing, rather than outwardly reading, that something is true eternally and infinitely. Proof, in other words, is the proposition the Kaplans place on the table. Readers able to quell their initial panic will find a vista of companionable curiosity as the authors commence by playing around with counting numbers, using axioms that form "bridges of equality" to the blackboard pronouncements of school math. Thus liberated from accepting things on authority, the avid reader discovers, guided by the Kaplans, provable properties of irrational, imaginary, and prime numbers; infinite series; plane geometry; trigonometry; and sets. Incorporating biographical asides about various mathematicians, the Kaplans prove themselves enlightening and entertaining ambassadors to the world of mathematics. Gilbert Taylor Copyright American Library Association. All rights reserved