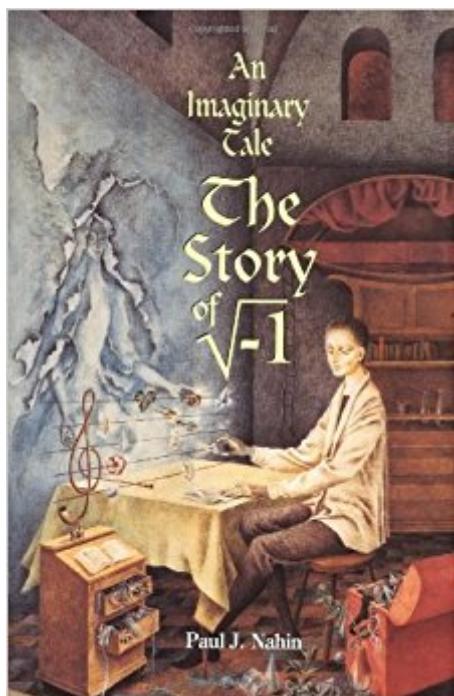


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# An Imaginary Tale: The Story Of [the Square Root Of Minus One]



## Synopsis

Today complex numbers have such widespread practical use--from electrical engineering to aeronautics--that few people would expect the story behind their derivation to be filled with adventure and enigma. In *An Imaginary Tale*, Paul Nahin tells the 2000-year-old history of one of mathematics' most elusive numbers, the square root of minus one, also known as  $i$ . He recreates the baffling mathematical problems that conjured it up, and the colorful characters who tried to solve them. In 1878, when two brothers stole a mathematical papyrus from the ancient Egyptian burial site in the Valley of Kings, they led scholars to the earliest known occurrence of the square root of a negative number. The papyrus offered a specific numerical example of how to calculate the volume of a truncated square pyramid, which implied the need for  $i$ . In the first century, the mathematician-engineer Heron of Alexandria encountered  $i$  in a separate project, but fudged the arithmetic; medieval mathematicians stumbled upon the concept while grappling with the meaning of negative numbers, but dismissed their square roots as nonsense. By the time of Descartes, a theoretical use for these elusive square roots--now called "imaginary numbers"--was suspected, but efforts to solve them led to intense, bitter debates. The notorious  $i$  finally won acceptance and was put to use in complex analysis and theoretical physics in Napoleonic times. Addressing readers with both a general and scholarly interest in mathematics, Nahin weaves into this narrative entertaining historical facts and mathematical discussions, including the application of complex numbers and functions to important problems, such as Kepler's laws of planetary motion and ac electrical circuits. This book can be read as an engaging history, almost a biography, of one of the most evasive and pervasive "numbers" in all of mathematics.

## Book Information

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## Customer Reviews

At the very beginning of his book on  $i$ , the square root of minus one, Paul Nahin warns his readers: "An Imaginary Tale has a very strong historical component to it, but that does not mean it is a mathematical lightweight. But don't read too much into that either. It is \*not\* a scholarly tome meant to be read only by some mythical, elite group.... Large chunks of this book can, in fact, be read and understood by a high school senior who has paid attention to his or her teachers in the standard fare of pre-college courses. Still, it will be most accessible to the million or so who each year complete a college course in freshman calculus.... But when I need to do an integral, let me assure you I have not fallen to my knees in dumbstruck horror. And neither should you." Nahin is a professor of electrical engineering at the University of New Hampshire; he has also written a number of science fiction short stories. His style is far more lively and humane than a mathematics textbook while covering much of the same ground. Readers will end up with a good sense for the mathematics of  $i$  and for its applications in physics and engineering. --Mary Ellen Curtin

Honorable Mention for the 1998 Award for Best Professional/Scholarly Book in Mathematics, Association of American Publishers One of Choice's Outstanding Academic Titles for 1999 "A book-length hymn of praise to the square root of minus one."--Brian Rotman, Times Literary Supplement "An Imaginary Tale is marvelous reading and hard to put down. Readers will find that Nahin has cleared up many of the mysteries surrounding the use of complex numbers."--Victor J. Katz, Science "[An Imaginary Tale] can be read for fun and profit by anyone who has taken courses in introductory calculus, plane geometry and trigonometry."--William Thompson, American Scientist "Someone has finally delivered a definitive history of this 'imaginary' number. . . . A must read for anyone interested in mathematics and its history."--D. S. Larson, Choice "Attempting to explain imaginary numbers to a non-mathematician can be a frustrating experience. . . . On such occasions, it would be most useful to have a copy of Paul Nahin's excellent book at hand."--A. Rice, Mathematical Gazette "Imaginary numbers! Threewe! Ninety-fifteen! No, not those kind of imaginary numbers. If you have any interest in where the concept of imaginary numbers comes from, you will be drawn into the wonderful stories of how  $i$  was discovered."--Rebecca Russ, Math Horizons "There will be something of reward in this book for everyone."--R.G. Keesing, Contemporary Physics "Nahin has given us a fine addition to the family of books about particular numbers. It is

interesting to speculate what the next member of the family will be about. Zero? The Euler constant? The square root of two? While we are waiting, we can enjoy *An Imaginary Tale*."--Ed Sandifer, MAA Online "Paul Nahin's book is a delightful romp through the development of imaginary numbers."--Robin J. Wilson, London Mathematical Society Newsletter

Great job by Prof. Nahin! Having gone through chapters 1-3, most of 6 and parts of chapters 4 and 7, I can highly recommend this to any non-mathematician who wants to know more about the history and math of  $i$ . Decent knowledge of calculus and basic trigonometry is recommended to get the most out of this book (and pencil&paper in some cases). Also bought the follow-up ("Dr Euler's famous formula") which will be next after completing this one.

It's excellent book. Just like with any book or product, there are always ways to make them better. Unfortunately, these days the universities and colleges don't teach mathematics by building good foundation. I think this book is the missing link that is needed to understand not only the origin but the mathematical importance of the imaginary and complex numbers. If you are an engineer or scientist, you'll find this book very informative and interesting. There are some places in the book where some details are left out but I believe on purpose because the author did not want to turn it into a two thousand page text book. I highly recommend reading this book if you are interested in mathematics, science or engineering even if you have a degree in one of those fields.

Very in depth book with excellent description and explanations. Very insightful and answered questions I had for a long time. Only downside I would point out is it is certainty not for everyone as the cover sort of misleads. Much of it is too difficult to understand unless you have a decent background in math.

This is a very enjoyable book for people like me, physicist, who when studying complex analysis, marveled at things like Cauchy's residue theorem, but could not deepen the fun due to the scarce time during graduate studies. Thanks to the fascinating historical facts thoroughly researched by Nahin, it is also an excellent example of how science works in general, like onion layers getting on top of each other through time to build the whole piece.

I loved reading this book. It is exactly what it states that it is, a story of imaginary numbers. A loving story. A history. Imaginary numbers have a fascinating history of very slow adoption through the

centuries, a history that wonderfully facilitates a certain love and joy of mathematics and better understanding of our struggles as humans to improve ourselves and better understand the language of the physical universe: mathematics. I did not find this book too tedious at all. Nothing run into the ground at all. If you encounter sections of this book with math too tedious for you, or if you are simply a more casual reader or don't have the time to go deeper, then do as I did, skip those sections. The vast majority of the book is text. The author is a mathematician, so he used mathematical examples, it is not a course book. I assert that the only way to do justice to math history is to include some math. Understanding imaginary numbers by the broader historical view offered in this book allowed me deeper insight and the ability to see deeper parallels with other areas of mathematics. Just as there were eons where people had no use for negative numbers, but where negative numbers were found convenient for arithmetic operations and so put into common everyday usage, so it goes for imaginary numbers. One of the reviewers wrote that this book is an excellent introductory treatment of complex analysis. I believe that reviewer to be a mathematician. I believe that the comment gives the wrong impression. This book is a historical story telling, not at all a text book. This book is great for a fun casual read by any curious person. There was lots of new and insightful stuff in this book for me. Highly recommended. A fun read.

I am not a mathematician, but I do like to inquire and read about math. I have always struggled with math, and my library is loaded with texts to help me. Complex math is an area which has always been mysterious, and I have Paul Nahin's "Dr. Euler's Fabulous Formula" which recommends his prior book, "An Imaginary Tale" to fill in details. The two books are a complimentary pair and a good source for learning about complex math. I still struggle, and a solid math background will help most readers through the books. Both texts are loaded with references and insights. It will take me a while to get the most from these books, but well worth it.

Math History told in a very entertainig way. Even if you don't have a strong math background it is still facinating to read about the thought process of true geniuses and how they provided the mathematical tools responsible for today's technology. Can't put it down, hopefully will only take me another six months to finish.

This book will introduce you to complex numbers, complex variables, and complex functions and you will be able to make the journey. You'll need a little familiarity with algebra but, like all these modern mathematical expositories, you can completely grasp the subject with diligence. The hard or

clever parts are spelled out for you. Perhaps there are some typos but I wasn't hampered appreciably by them. Some beautiful and elegant mathematics is exposed very sensitively in this book and with a great appreciation for the chronology and history of the process. The demonstration bears out Hadamard's comment, "The shortest distance two points in the real plane often passes through the complex plane." This book really spurred on my interest in complex variables. The continued study of complex math can take you to some stunning and unexpected connections in mathematics. I encourage interested readers to consider this book as a starting place for that journey.

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