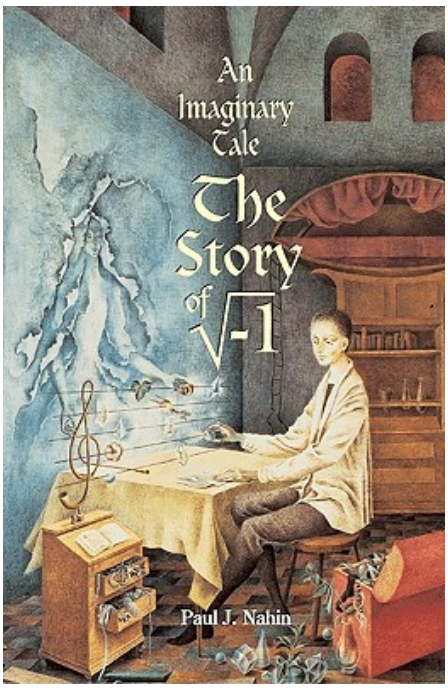

An Imaginary Tale: The Story of the Square Root of Minus One

Paul J. Nahin

An Imaginary Tale: The Story of the Square Root of Minus One

Paul J. Nahin

An Imaginary Tale: The Story of the Square Root of Minus One Paul J. Nahin
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, re-creating the baffling mathematical problems that conjured it up and the colorful characters who tried to solve them. Addressing readers with both a general and scholarly interest in mathematics, Nahin weaves into this narrative entertaining historical facts, mathematical discussions, and the application of complex numbers and functions to important problems.

An Imaginary Tale: The Story of the Square Root of Minus One Details

Date	:	Published February 1st 2007 by Princeton University Press (first published 1998)
ISBN	:	9780691127989
Author	:	Paul J. Nahin
Format	:	Paperback 267 pages
Genre	:	Science, Mathematics, Nonfiction, History

From Reader Review An Imaginary Tale: The Story of the Square Root of Minus One for online ebook

Kaylee says

It's only been three and a half years since I've been in an upper-level math class, and yet, I felt like a dunce at many points in this book.

Granted, that may have been due to Nahin's decidedly engineer-fascinated-by-math style of writing (that style *does* exist, I swear; I grew up with my dad teaching me math in a way that can only be described as filtered through an engineer's mind); aside from my dad, the people I spoke math with were all mathematicians.

I should have read this when I first received it as a gift if I wanted to fully grasp all of the equations. As it was, despite my degree in math and the insanely slow pace I took reading this, the lack of constant use of many equations and theorems shown in the book meant I recognized the name and the general idea, but was totally lost on some of his executions.

---

mirela Darau says

I simply loved reading this book, and I was thrilled to see how mathematics worked some centuries ago! Another good thing about this book is that the author's arguments and explanations are mostly simple and can be followed...

Nathan Glenn says

I'm going to hold off on rating this for now, since the Kindle edition is so messed up that I could not read a lot of the formulas.
This book is a comprehensive history of the number i. It explains the history of the idea of the number itself, its geometric and interpretation, and then its applications.
He says that a high school graduate who studied calculus should be fine reading it, but I wouldn't quite agree. You have to have calculus pretty fresh on your mind to just dive into this. It has some really heavy math in it, and it is good to keep in mind that it is meant as a readable history for mathematicians. The theory starts small, showing that "imaginary" numbers are in a number plane instead of a number line, and goes through several aspects of complex analysis including harmonic functions and contour integrals, describing interesting characters along the way. It was fun to read, but I was completely lost on the math. Quite a heavy read.

Gabriel says

While best read by those with a pad of paper, a pencil and their fare share of mathematical knowledge, this has been a very cool read about the history of the imaginary number and how mathematicians think.

Matt says

Very technical for a popular book, though admittedly most of my reference points are pop science rather than pop maths. (It's certainly no The Road to Reality: A Complete Guide to the Laws of the Universe, but it's far more mathematical than any other pop science book I can think of, and it's much more demanding than, say, Ellenberg's excellent How Not to Be Wrong: The Power of Mathematical Thinking, which is the only pop maths book I can think of off the top of my head.) In any case, I found it heavy going, and had to accept that a fair portion would go over my head unless I was willing to spend a huge amount of time and effort. So I'm not in a position to judge whether it would be enjoyable for readers with the background & intelligence to follow it closely (though I suspect that it would be).

For me it was worthwhile in parts & frustrating in others. Mostly that's simply the result of my own ignorance/laziness/stupidity, but I did sometimes feel that Nahin wasn't quite sure who he was writing for: he would occasionally pause to explain a very basic concept, then in the next breath launch into a torrent of formal mathematics with little in the way of verbal guidance. (Mostly, though, he was clearly aiming at people with a fairly solid mathematical background.) There were some sections that I could have grasped a lot more quickly & easily with just slightly more hand-holding; sometimes a logical leap that would be obvious to a mathematician took me an embarassingly long time to understand. I assume something similar is true of some of the proofs I gave up on following, though others were genuinely too hard for me, and by the final chapter I was doing a lot of skim-reading.

Anyway, I suspect I might have loved this book had I been a bit smarter or better educated. In reality, it was probably worth reading, but only just.

WarpDrive says

This is a great book about one of the most beautiful and fascinating subjects of maths: the world of imaginary/complex numbers and of complex analysis.

This is a book unapologetically mathematical in contents and approach, a real math book with real math, sometimes dense and sometimes beyond the “freshman calculus” level, but it is never too difficult if you have the patience and perseverance to go through the many fascinating and intriguing examples and theorems. And if you persevere, the intellectual rewards to the reader are well worth the effort.

The author manages to effectively convey, with concrete and fascinating examples, the intellectual adventure of discovery and unveiling of the beautiful world of complex numbers.
Several very intriguing results are demonstrated by the author throughout the book, many of which could not be possibly be demonstrated without the usage of imaginary numbers. The author, in other words, brilliantly and consistently demonstrates what the mathematician Hadamard once said: "The shortest path between two truths in the real domain passes through the complex domain".

The book presents fascinating examples about the physical signature for the complex roots in the plot of quadratic and cubic functions. The relationship between complex numbers and geometry, and physical

solutions to real problems, is also treated quite well.
The author then effectively demonstrates the sheer beauty and simplicity of the geometric interpretation of the complex numbers and of the corresponding definition of "i" as the rotation operator; he also shows how such interpretation, supported by the famous Le Moivre theorem, can be used to generate countless trig identities.

Other beautiful results and identities are also very nicely explained by the author: examples are the famous Euler's identity, the result that "i" to the "i" gives you real numbers, the quite astonishing result that 1^pi (number "1" to the power of pi) - which after all is just a real number by a real power - has an infinity of distinct complex values.

There is also a quite interesting chapter about the utilization of complex numbers in areas of physics such as special relativity, the derivation of Kepler's first law of elliptical orbit (and his other laws) from Newton's physics, and in electrical engineering problems. Disappointingly (and surprisingly) the fundamental character of complex numbers in quantum mechanics is not treated by the author. I was also disappointed by the fact that fractals are not treated in this book either.

In chapter 6 (aptly titled "wizard mathematics"), things get mathematically serious: the book gets into more intense but also very intriguing mathematical territory. This is very rewarding albeit somewhat slow read.
The Euler's constant and the zeta function are explained in a nice and clear manner. Some of Euler's derivations, so beautifully presented by the author, can be clearly seen as the product of pure, raw genius.
And the beauty of higher mathematics can be seen in its power, when we start digging into things such as the derivation of the value of pi from i, the Fresnel integrals, gamma functions extended to complex values and their relationship to the zeta functions, the Riemann hypothesis etc.
These are all beautiful derivations and examples almost perfectly executed by the author, with only the very occasional minor typo or missing step or partial demonstration (for example, only a trivial case of the reflection formula is actually proved), and occasionally peculiar notational choices. However it is not a textbook and it does not pretend to be a textbook, so the occasional lack of mathematical rigor is totally forgivable, in my opinion.

We finally get, in the last chapter, to the dessert of this rich and rewarding intellectual buffet: complex function theory.
I strongly agree with the author when he states: "it wasn't until my first course in complex function theory that I experienced a totally new emotion - the pure pleasure of learning mathematics that was, in and of itself, pretty."
The analysis of complex functions requires by itself at least a separate book, but the author does an egregious job in conveying the beauty of some fundamental and fascinating results within the space of the last chapter of his book. He focuses on Cauchy's first and second integral theorems. The latter theorem is particularly beautiful: the intimate connection between the value of a complex analytical function f(z) at an internal point inside a region delimited by C, and its contour integral on C, is another illustration of the very special nature of complex functions. The way the author explain Cauchy's contour integrals is just great.

It is clear from the book that the author loves mathematics, appreciates its sheer beauty, and simply loves showing off beautiful equations, graphical tricks, awesome solutions and great intellectual challenges bringing out counter-intuitive and astonishing results.

Overall, this is a hugely rewarding book, highly recommended to anybody who loves mathematics. A joy to read. 4.5 stars, rounded up to 5 stars given the fascinating subject of this book and the energy and enthusiasm of the author.

David says

Best to have some familiarity with calculus; given that, this is a wonderful book about the historical development of mathematics involving imaginary numbers. The final chapters display some powerful ideas that lead to non-intuitive results.

Ghada says

I've been bored with reading novels lately, so I was looking for something a bit more inspiring and challenging. This book really hit the spot!

I wouldn't call it a non-fiction book per se, but something more of a supplementary book for those interested in digging deeper into a subject. Here the subject under discussion was complex numbers (specifically the imaginary number i).

In the preface, the author claims that no book has ever been written on this subject alone in a non-text book form, so he took it upon himself to do so (he is an electrical engineer and was fascinated with complex numbers while growing up). Well hats off to Eng. Nahin, because he did an amazing job!

The author began with a historical summary of i and the mathematical problems that it surfaced from. He then moved on to some important applications. I really enjoyed chapters 4-6, which contained some problems and uses of complex numbers. There was a chapter titled "Wizard Mathematics"!! I had a field day with that one. The title alone was so exciting!

I loved going through the proof of how according to complex number theory, the shortest distance between two points is NOT a straight line (shortcuts through hyperspace?!?... I know right!), Schellbach's method of using i^i to calculate pi, and more on the genius of Professor Euler. Even the Appendixes were rich with more problems and proofs, it makes you want to savor every page!

I just wish that I had read this book while I was studying complex numbers and Cauchy's Theorems last year. It would've been easier to work out all the derivations while everything was still fresh. I think that the reader would appreciate this book more if she/he had at least some basic knowledge of complex numbers and calculus. It is definitely worth going through the mathematics yourself using pencil and paper, because let me tell you The Story of i is epic!

Stanley Xue says

First math book I read that actually had a lot of satisfying math. Only had a high school understanding of complex numbers and calculus beforehand. It was very rewarding to go through this learning experience. Nahin takes you on a journey through history from the origins of the imaginary number - surprisingly popping up when solving cubic equations, and then to Euler's contributions, case studies in using complex

numbers to prove important scientific results such as Kepler's equations, and up to basic complex function theory.
LOTS OF MATHS. Great for people sick of arm-wavy popular science/maths books (and don't have enough energy to wade through a university textbook). Structuring the book through historical discoveries and building up just enough of a picture of who these great mathematicians were (BUT STILL KEEPING A LOT OF MATHS AND CLEAR EXPLANATION TO NOT SOUND TOO WAFFLY) kept me engaged through the whole book.

Jason says

Great history and math book. You definitely need a lot of math to fully appreciate this book (if you don't have background up to trig, and preferably calculus, you'll find all but the first couple of chapters impenetrable). If you fit the pre-reqs though, it is very interesting. I found how much my math has degenerated as every now and then I just had to shrug and just move on. (I do look forward to going back and with pencil and paper trying out some of the more hairy calculations.) Now, after all that, I would say even if you don't have a strong math background, the history part is very interesting and some of the simple math concepts as they evolved are keen, so it would be worth your while to crack the book open and read the first couple chapters.

---

ajp3 says

one of the best mathematics books ever written. the last two chapters have significant mathematical formalism (mostly complex analysis), but up until that point almost any calculus student will understand the arguments presented. some of the most elegant and beautiful ideas are covered in this surprisingly short book. I love it and try to read it often.

Erik says

I now realize why I took all that #@$%#$ math in University: it was to be able to read this book. Why can't school math be presented like this? Anyway, if you remember any trig or calc read this and enjoy the part where Einstein's contribution to general relativity gets explained it a way that makes sense.

Edit: This is a real math book, with real math. Like, solving differential equations math. But there's a story you can follow without following every step of the calculations as long as you can intuit why the result makes sense. So it's pretty perfect.

Vicki Cline says

I was hoping to really like this book, as it involves my favorite equation, Euler's identity,

e^(i * pi) + 1 = 0.

Such an elegant way to connect the five most important constants in math, along with fundamental mathematical operations. Unfortunately, the understanding of the math involved in the book, which I'm sure I used to have 50 years ago when I got my BA in math, has left me. I had to skip over most of the equations in the book (and there are a lot of them), so I don't even know if I can count this book as "read." But what I was able to read was interesting, especially the early history, where the concept of the square root of minus one helped solve otherwise intractable problems, but the men who figured out the methods were so reluctant to believe in it as a number (hence the designation "imaginary").

Jessica says

Yeah, yeah, I should know better than to expect much from a book on math, but I've actually read some decent ones. This one was supposed to be on layman's terms, but it was so technical that it might as well have been written in French. Nothing was explained in plain English--it was all equations and made me feel rather stupid. I'm going to be teaching math, after all, but man, it was way over my head. Not that I expect anyone to actually read it, but just in case you were tempted, don't.

Rupesh Kumar says

Adding an imaginary number imaginary times may yield a real number. After reading this book you'll come to know what is imaginary is not actually imaginary.
It is complex, isn't it?:-)
A great book for those who love mathematics.
