

This volume is analysis on the real line: sequences and series, limits and continuity, the derivative, the integral, and power series. It starts from a short list of axioms for the real numbers, the axioms of a complete ordered field, and proves everything else from them.

Who it is for. The reader we have in mind can already read and write proofs: negate a quantified statement, name a witness, run an induction, chase an element through a preimage. *Logic and Proof* and the first three chapters of *Sets, Relations, and Cardinality* teach exactly these skills, and this volume cites them where it uses them. *Number Systems: From $\mathbb{N}$ to $\mathbb{R}$* builds $\mathbb{R}$ from the rationals and proves that the axioms hold for it; this volume does not need that construction, since it takes the axioms as its starting point.

What it covers.

Chapter	Title
1	Ordered Fields and the Least Upper Bound Axiom
2	Sequences, Subsequences, and Cauchy Sequences
3	Infinite Series
4	Open, Closed, and Compact Subsets of $\mathbb{R}$
5	Limits of Functions and Continuity
6	Continuous Functions on Compact Sets and Intervals
7	The Derivative and the Mean Value Theorem
8	The Riemann–Darboux Integral
9	Sequences and Series of Functions
10	Power Series, Taylor Series, and the Elementary Functions
11	The Forms of Completeness

Chapter 1 states the axioms and draws the first consequences of the one that separates $\mathbb{R}$ from $\mathbb{Q}$, the least upper bound axiom. Chapters 2–10 build the analysis of one real variable on it. Chapter 11 returns to the axiom and shows which other “no gaps” properties could replace it. Only Chapter 1 is written so far; the others will follow in the order of the table.

How to read it. Read the chapters in order: each uses the ones before it. Every section has Quick checks with folded answers; answer each one before you unfold it. The exercises of a section come in three groups, A to check understanding, B for practice and C to go deeper, and the last section of each chapter adds R items that reach back to earlier chapters. A chapter’s opening page lists what it needs, with links, and the time it takes. Results marked optional can be skipped, and nothing outside them depends on them.

What else you need. Besides the two volumes named above, only school algebra is assumed. A few facts about fields are quoted from the companion *Linear Algebra* book, each with a link.