Number Theory or arithmetic, as some prefer to call it, is the oldest, purest, liveliest, most elementary yet sophisticated field of mathematics. It is no coincidence that the fundamental science of numbers has come to be known as the "Queen of Mathematics." Indeed some of the most complex conventions of the mathematical mind have evolved from the study of basic problems of number theory. Andre Weil, one of the outstanding contributors to
number theory, has written an historical exposition of this subject; his study examines texts that span roughly thirty-six centuries of arithmetical work from an Old Babylonian tablet, datable to the time of Hammurapi to Legendre’s Essai sur la Théorie des Nombres (1798). Motivated by a desire to present the substance of his field to the educated reader, Weil employs an historical approach in the analysis of problems and evolving methods of number theory and their significance within mathematics. In the course of his study Weil accompanies the reader into the workshops of four major authors of modern number theory (Fermat, Euler, Lagrange and Legendre) and there he conducts a detailed and critical examination of their work. Enriched by a broad coverage of intellectual history, Number Theory represents a major contribution to the understanding of our cultural heritage."

**Number Theory**-André Weil  
2006-12-22 This book presents a historical overview of number theory. It examines texts that span some thirty-six centuries of arithmetical work, from an Old Babylonian tablet to Legendre’s Essai sur la Théorie des Nombres, written in 1798. Coverage employs a historical approach in the analysis of problems and evolving methods of number theory and their significance within mathematics. The book also takes the reader into the workshops of four major authors of modern number theory: Fermat, Euler, Lagrange and Legendre and presents a detailed and critical examination of their work.

**Number Theory and Its History**-Oystein Ore  
2012-07-06 Unusually clear, accessible introduction covers counting, properties of numbers, prime numbers, Aliquot parts, Diophantine problems, congruences, much more. Bibliography.

**Elementary Number Theory**-Ethan D. Bolker  
2012-06-14 This text uses the concepts usually taught in the first semester of a modern abstract algebra course to
illuminate classical number theory: theorems on primitive roots, quadratic Diophantine equations, and more.

**Number Theory**-George E. Andrews 2012-04-30
Undergraduate text uses combinatorial approach to accommodate both math majors and liberal arts students. Covers the basics of number theory, offers an outstanding introduction to partitions, plus chapters on multiplicativity-divisibility, quadratic congruences, additivity, and more

**An Illustrated Theory of Numbers**-Martin H. Weissman 2020-09-15
News about this title: — Author Marty Weissman has been awarded a Guggenheim Fellowship for 2020. (Learn more here.) — Selected as a 2018 CHOICE Outstanding Academic Title — 2018 PROSE Awards Honorable Mention
An Illustrated Theory of Numbers gives a comprehensive introduction to number theory, with complete proofs, worked examples, and exercises. Its exposition reflects the most recent scholarship in mathematics and its history. Almost 500 sharp illustrations accompany elegant proofs, from prime decomposition through quadratic reciprocity. Geometric and dynamical arguments provide new insights, and allow for a rigorous approach with less algebraic manipulation. The final chapters contain an extended treatment of binary quadratic forms, using Conway's topograph to solve quadratic Diophantine equations (e.g., Pell's equation) and to study reduction and the finiteness of class numbers. Data visualizations introduce the reader to open questions and cutting-edge results in analytic number theory such as the Riemann hypothesis, boundedness of prime gaps, and the class number 1 problem. Accompanying each chapter, historical notes curate primary sources and secondary scholarship to trace the development of number theory within and outside the Western tradition. Requiring only high school algebra and geometry, this
text is recommended for a first course in elementary number theory. It is also suitable for mathematicians seeking a fresh perspective on an ancient subject.

**Elementary Number Theory: Primes, Congruences, and Secrets**

William Stein 2008-10-28 This is a book about prime numbers, congruences, secret messages, and elliptic curves that you can read cover to cover. It grew out of undergraduate courses that the author taught at Harvard, UC San Diego, and the University of Washington. The systematic study of number theory was initiated around 300 B.C. when Euclid proved that there are infinitely many prime numbers, and also cleverly deduced the fundamental theorem of arithmetic, which asserts that every positive integer factors uniquely as a product of primes. Over a thousand years later (around 972 A.D.) Arab mathematicians formulated the congruent number problem that asks for a way to decide whether or not a given positive integer n is the area of a right triangle, all three of whose sides are rational numbers. Then another thousand years later (in 1976), Di?e and Hellman introduced the ?rst ever public-key cryptosystem, which enabled two people to communicate secretly over a public communications channel with no predetermined secret; this invention and the ones that followed it revolutionized the world of digital communication. In the 1980s and 1990s, elliptic curves revolutionized number theory, providing striking new insights into the congruent number problem, primality testing, public key cryptography, attacks on public-key systems, and playing a central role in Andrew Wiles’ resolution of Fermat’s Last Theorem.

**Number Theory**

John J. Watkins 2013-12-26 An introductory textbook with a unique historical approach to teaching number theory The natural numbers have been studied for thousands of years, yet most
undergraduate textbooks present number theory as a long list of theorems with little mention of how these results were discovered or why they are important. This book emphasizes the historical development of number theory, describing methods, theorems, and proofs in the contexts in which they originated, and providing an accessible introduction to one of the most fascinating subjects in mathematics. Written in an informal style by an award-winning teacher, Number Theory covers prime numbers, Fibonacci numbers, and a host of other essential topics in number theory, while also telling the stories of the great mathematicians behind these developments, including Euclid, Carl Friedrich Gauss, and Sophie Germain. This one-of-a-kind introductory textbook features an extensive set of problems that enable students to actively reinforce and extend their understanding of the material, as well as fully worked solutions for many of these problems. It also includes helpful hints for when students are unsure of how to get started on a given problem. Uses a unique historical approach to teaching number theory Features numerous problems, helpful hints, and fully worked solutions Discusses fun topics like Pythagorean tuning in music, Sudoku puzzles, and arithmetic progressions of primes Includes an introduction to Sage, an easy-to-learn yet powerful open-source mathematics software package Ideal for undergraduate mathematics majors as well as non-math majors Digital solutions manual (available only to professors)

An Adventurer's Guide to Number Theory - Richard Friedberg 2012-07-06 This witty introduction to number theory deals with the properties of numbers and numbers as abstract concepts. Topics include primes, divisibility, quadratic forms, and related theorems.

Number Theory for Beginners - Andre Weil 2012-12-06 In the summer
quarter of 1949, I taught a ten-weeks introductory course on number theory at the University of Chicago; it was announced in the catalogue as "Algebra 251". What made it possible, in the form which I had planned for it, was the fact that Max Rosenlicht, now of the University of California at Berkeley, was then my assistant. According to his recollection, "this was the first and last time, in the history of the Chicago department of mathematics, that an assistant worked for his salary". The course consisted of two lectures a week, supplemented by a weekly "laboratory period" where students were given exercises which they were asked to solve under Max's supervision and (when necessary) with his help. This idea was borrowed from the "Praktikum" of German universities. Being alien to the local tradition, it did not work out as well as I had hoped, and student attendance at the problem sessions so on became desultory. Weekly notes were written up by Max Rosenlicht and issued week by week to the students. Rather than a literal reproduction of the course, they should be regarded as its skeleton; they were supplemented by references to standard textbooks on algebra. Max also contributed by far the larger part of the exercises. None of this was meant for publication.

**Nuggets of Number Theory**-Roger B. Nelsen
2018-08-07 Nuggets of Number Theory will attract fans of visual thinking, number theory, and surprising connections. This book contains hundreds of visual explanations of results from elementary number theory. Figurate numbers and Pythagorean triples feature prominently, of course, but there are also proofs of Fermat's Little and Wilson's Theorems. Fibonacci and perfect numbers, Pell's equation, and continued fractions all find visual representation in this charming collection. It will be a rich source of visual inspiration for anyone teaching, or learning, number theory and will provide endless pleasure to those...
interested in looking at number theory with new eyes. [Author]; Roger Nelsen is a long-time contributor of "Proofs Without Words" in the MAA's Mathematics Magazine and College Mathematics Journal. This is his twelfth book with MAA Press.

A Course in Number Theory-H. E. Rose 1995 This textbook covers the main topics in number theory as taught in universities throughout the world. Number theory deals mainly with properties of integers and rational numbers; it is not an organized theory in the usual sense but a vast collection of individual topics and results, with some coherent sub-theories and a long list of unsolved problems. This book excludes topics relying heavily on complex analysis and advanced algebraic number theory. The increased use of computers in number theory is reflected in many sections (with much greater emphasis in this edition). Some results of a more advanced nature are also given, including the Gelfond-Schneider theorem, the prime number theorem, and the Mordell-Weil theorem. The latest work on Fermat's last theorem is also briefly discussed. Each chapter ends with a collection of problems; hints or sketch solutions are given at the end of the book, together with various useful tables.

A Pythagorean Introduction to Number Theory-Ramin Takloo-Bighash 2018-11-26 Right triangles are at the heart of this textbook’s vibrant new approach to elementary number theory. Inspired by the familiar Pythagorean theorem, the author invites the reader to ask natural arithmetic questions about right triangles, then proceeds to develop the theory needed to respond. Throughout, students are encouraged to engage with the material by posing questions, working through exercises, using technology, and learning about the broader context in which ideas developed. Progressing from the fundamentals of number
theory through to Gauss sums and quadratic reciprocity, the first part of this text presents an innovative first course in elementary number theory. The advanced topics that follow, such as counting lattice points and the four squares theorem, offer a variety of options for extension, or a higher-level course; the breadth and modularity of the later material is ideal for creating a senior capstone course. Numerous exercises are included throughout, many of which are designed for SageMath. By involving students in the active process of inquiry and investigation, this textbook imbues the foundations of number theory with insights into the lively mathematical process that continues to advance the field today. Experience writing proofs is the only formal prerequisite for the book, while a background in basic real analysis will enrich the reader’s appreciation of the final chapters.

A Course in Analytic Number Theory-Marius Overholt 2014-12-30

This book is an introduction to analytic number theory suitable for beginning graduate students. It covers everything one expects in a first course in this field, such as growth of arithmetic functions, existence of primes in arithmetic progressions, and the Prime Number Theorem. But it also covers more challenging topics that might be used in a second course, such as the Siegel-Walfisz theorem, functional equations of L-functions, and the explicit formula of von Mangoldt. For students with an interest in Diophantine analysis, there is a chapter on the Circle Method and Waring's Problem. Those with an interest in algebraic number theory may find the chapter on the analytic theory of number fields of interest, with proofs of the Dirichlet unit theorem, the analytic class number formula, the functional equation of the Dedekind zeta function, and the Prime Ideal Theorem. The exposition is both clear and precise, reflecting careful attention to the needs of the reader. The text includes extensive historical notes, which occur at the ends of the
chapters. The exercises range from introductory problems and standard problems in analytic number theory to interesting original problems that will challenge the reader. The author has made an effort to provide clear explanations for the techniques of analysis used. No background in analysis beyond rigorous calculus and a first course in complex function theory is assumed.

An Open Door to Number Theory - Duff Campbell
2018-05-03 A well-written, inviting textbook designed for a one-semester, junior-level course in elementary number theory. The intended audience will have had exposure to proof writing, but not necessarily to abstract algebra. That audience will be well prepared by this text for a second-semester course focusing on algebraic number theory. The approach throughout is geometric and intuitive; there are over 400 carefully designed exercises, which include a balance of calculations, conjectures, and proofs. There are also nine substantial student projects on topics not usually covered in a first-semester course, including Bernoulli numbers and polynomials, geometric approaches to number theory, the $p$-adic numbers, quadratic extensions of the integers, and arithmetic generating functions.

Number Theory Through Inquiry - David C. Marshall
2020-08-21 Number Theory Through Inquiry is an innovative textbook that leads students on a carefully guided discovery of introductory number theory. The book has two equally significant goals. One goal is to help students develop mathematical thinking skills, particularly, theorem-proving skills. The other goal is to help students understand some of the wonderfully rich ideas in the mathematical study of numbers. This book is appropriate for a proof transitions course, for an independent study experience, or for a course designed as an introduction to abstract mathematics. Math or related majors, future teachers, and students or adults interested in exploring
mathematical ideas on their own will enjoy Number Theory Through Inquiry. Number theory is the perfect topic for an introduction-to-proofs course. Every college student is familiar with basic properties of numbers, and yet the exploration of those familiar numbers leads us to a rich landscape of ideas. Number Theory Through Inquiry contains a carefully arranged sequence of challenges that lead students to discover ideas about numbers and to discover methods of proof on their own. It is designed to be used with an instructional technique variously called guided discovery or Modified Moore Method or Inquiry Based Learning (IBL). Instructors’ materials explain the instructional method. This style of instruction gives students a totally different experience compared to a standard lecture course. Here is the effect of this experience: Students learn to think independently: they learn to depend on their own reasoning to determine right from wrong; and they develop the central, important ideas of introductory number theory on their own. From that experience, they learn that they can personally create important ideas, and they develop an attitude of personal reliance and a sense that they can think effectively about difficult problems. These goals are fundamental to the educational enterprise within and beyond mathematics.

**Elementary Number Theory**-Joe Roberts 1977

**A Computational Introduction to Number Theory and Algebra**-Victor Shoup 2005-04-28 This introductory book emphasises algorithms and applications, such as cryptography and error correcting codes.

**Factorization**-Steven H. Weintraub 2008-05-15 The concept of factorization, familiar in the ordinary system of whole numbers that can be written as a unique product of prime numbers, plays a central role in modern mathematics and its
applications. This exposition of the classic theory leads the reader to an understanding of the current knowledge of the subject and its connections to other mathematical concepts, for example in algebraic number theory. The book can be used as a text for a first course in number theory or for self-study by motivated high school students or readers interested in modern mathematics.

**Algebra and Number Theory**-Martyn R. Dixon
2011-07-15

Explore the main algebraic structures and number systems that play a central role across the field of mathematics. Algebra and number theory are two powerful branches of modern mathematics at the forefront of current mathematical research, and each plays an increasingly significant role in different branches of mathematics, from geometry and topology to computing and communications. Based on the authors' extensive experience within the field, Algebra and Number Theory has an innovative approach that integrates three disciplines—linear algebra, abstract algebra, and number theory—into one comprehensive and fluid presentation, facilitating a deeper understanding of the topic and improving readers' retention of the main concepts. The book begins with an introduction to the elements of set theory. Next, the authors discuss matrices, determinants, and elements of field theory, including preliminary information related to integers and complex numbers. Subsequent chapters explore key ideas relating to linear algebra such as vector spaces, linear mapping, and bilinear forms. The book explores the development of the main ideas of algebraic structures and concludes with applications of algebraic ideas to number theory. Interesting applications are provided throughout to demonstrate the relevance of the discussed concepts. In addition, chapter exercises allow readers to test their comprehension of the presented material. Algebra and Number Theory is an excellent book for courses on linear algebra, abstract algebra, and number theory at
the upper-undergraduate level. It is also a valuable reference for researchers working in different fields of mathematics, computer science, and engineering as well as for individuals preparing for a career in mathematics education.

**Number Theory**-George E. Andrews 1994-10-12 Written by a distinguished mathematician and teacher, this undergraduate text uses a combinatorial approach to accommodate both math majors and liberal arts students. In addition to covering the basics of number theory, it offers an outstanding introduction to partitions, plus chapters on multiplicativity-divisibility, quadratic congruences, additivity, and more.

**Number Theory Revealed: An Introduction**-Andrew Granville 2019-11-12 Number Theory Revealed: An Introduction acquaints undergraduates with the “Queen of Mathematics”. The text offers a fresh take on congruences, power residues, quadratic residues, primes, and Diophantine equations and presents hot topics like cryptography, factoring, and primality testing. Students are also introduced to beautiful enlightening questions like the structure of Pascal's triangle mod p and modern twists on traditional questions like the values represented by binary quadratic forms and large solutions of equations. Each chapter includes an “elective appendix” with additional reading, projects, and references. An expanded edition, Number Theory Revealed: A Masterclass, offers a more comprehensive approach to these core topics and adds additional material in further chapters and appendices, allowing instructors to create an individualized course tailored to their own (and their students’) interests.

**An Experimental Introduction to Number Theory**-Benjamin Hutz 2018-04-17 This book presents material suitable for an undergraduate course in
elementary number theory from a computational perspective. It seeks to not only introduce students to the standard topics in elementary number theory, such as prime factorization and modular arithmetic, but also to develop their ability to formulate and test precise conjectures from experimental data. Each topic is motivated by a question to be answered, followed by some experimental data, and, finally, the statement and proof of a theorem. There are numerous opportunities throughout the chapters and exercises for the students to engage in (guided) open-ended exploration. At the end of a course using this book, the students will understand how mathematics is developed from asking questions to gathering data to formulating and proving theorems. The mathematical prerequisites for this book are few. Early chapters contain topics such as integer divisibility, modular arithmetic, and applications to cryptography, while later chapters contain more specialized topics, such as Diophantine approximation, number theory of dynamical systems, and number theory with polynomials. Students of all levels will be drawn in by the patterns and relationships of number theory uncovered through data driven exploration.

Problems in Analytic Number Theory-U.S.R. Murty 2013-06-29 "In order to become proficient in mathematics, or in any subject," writes Andre Weil, "the student must realize that most topics involve only a small number of basic ideas. " After learning these basic concepts and theorems, the student should "drill in routine exercises, by which the necessary reflexes in handling such concepts may be acquired. . . . There can be no real understanding of the basic concepts of a mathematical theory without an ability to use them intelligently and apply them to specific problems. " Weil's insightful observation becomes especially important at the graduate and research level. It is the viewpoint of this book. Our goal is to acquaint the student with the methods of analytic number theory as
rapidly as possible through examples and exercises. Any landmark theorem opens up a method of attacking other problems. Unless the student is able to sift out from the mass of theory the underlying techniques, his or her understanding will only be academic and not that of a participant in research. The prime number theorem has given rise to the rich Tauberian theory and a general method of Dirichlet series with which one can study the asymptotics of sequences. It has also motivated the development of sieve methods. We focus on this theme in the book. We also touch upon the emerging Selberg theory (in Chapter 8) and $p$-adic analytic number theory (in Chapter 10).

**Number Theory Revealed: A Masterclass**

Andrew Granville 2020-09-23

Number Theory Revealed: A Masterclass acquaints enthusiastic students with the “Queen of Mathematics”. The text offers a fresh take on congruences, power residues, quadratic residues, primes, and Diophantine equations and presents hot topics like cryptography, factoring, and primality testing. Students are also introduced to beautiful enlightening questions like the structure of Pascal's triangle mod $p$ and modern twists on traditional questions like the values represented by binary quadratic forms, the anatomy of integers, and elliptic curves. This Masterclass edition contains many additional chapters and appendices not found in Number Theory Revealed: An Introduction, highlighting beautiful developments and inspiring other subjects in mathematics (like algebra). This allows instructors to tailor a course suited to their own (and their students') interests. There are new yet accessible topics like the curvature of circles in a tiling of a circle by circles, the latest discoveries on gaps between primes, a new proof of Mordell's Theorem for congruent elliptic curves, and a discussion of the $abc$-conjecture including its proof for polynomials. About the Author: Andrew Granville is the Canada Research Chair in Number Theory at the University of Montreal and...
professor of mathematics at University College London. He has won several international writing prizes for exposition in mathematics, including the 2008 Chauvenet Prize and the 2019 Halmos-Ford Prize, and is the author of Prime Suspects (Princeton University Press, 2019), a beautifully illustrated graphic novel murder mystery that explores surprising connections between the anatomies of integers and of permutations.

**Elementary Number Theory** - James S. Kraft  
2014-11-24 Elementary Number Theory takes an accessible approach to teaching students about the role of number theory in pure mathematics and its important applications to cryptography and other areas. The first chapter of the book explains how to do proofs and includes a brief discussion of lemmas, propositions, theorems, and corollaries. The core of the text covers linear Diophantine equations; unique factorization; congruences; Fermat’s, Euler’s, and Wilson’s theorems; order and primitive roots; and quadratic reciprocity. The authors also discuss numerous cryptographic topics, such as RSA and discrete logarithms, along with recent developments. The book offers many pedagogical features. The "check your understanding" problems scattered throughout the chapters assess whether students have learned essential information. At the end of every chapter, exercises reinforce an understanding of the material. Other exercises introduce new and interesting ideas while computer exercises reflect the kinds of explorations that number theorists often carry out in their research.

**Multiplicative Number Theory** - H. Davenport  
2013-06-29 Although it was in print for a short time only, the original edition of Multiplicative Number Theory had a major impact on research and on young mathematicians. By giving a connected account of the large sieve and Bombieri's
theorem, Professor Davenport made accessible an important body of new discoveries. With this stimulation, such great progress was made that our current understanding of these topics extends well beyond what was known in 1966. As the main results can now be proved much more easily. I made the radical decision to rewrite §§23-29 completely for the second edition. In making these alterations I have tried to preserve the tone and spirit of the original. Rather than derive Bombieri's theorem from a zero density estimate for $L$-functions, as Davenport did, I have chosen to present Vaughan's elementary proof of Bombieri's theorem. This approach depends on Vaughan's simplified version of Vinogradov's method for estimating sums over prime numbers (see §24). Vinogradov devised his method in order to estimate the sum $LPH e(prx)$; to maintain the historical perspective I have inserted (in §§25, 26) a discussion of this exponential sum and its application to sums of primes, before turning to the large sieve and Bombieri's theorem.

Before Professor Davenport's untimely death in 1969, several mathematicians had suggested small improvements which might be made in Multiplicative Number Theory, should it ever be reprinted.

**Number, Shape, & Symmetry**-Diane L. Herrmann 2012-10-18

Through a careful treatment of number theory and geometry, Number, Shape, & Symmetry: An Introduction to Number Theory, Geometry, and Group Theory helps readers understand serious mathematical ideas and proofs. Classroom-tested, the book draws on the authors’ successful work with undergraduate students at the University of Chicago, seventh to tenth grade mathematically talented students in the University of Chicago’s Young Scholars Program, and elementary public school teachers in the Seminars for Endorsement in Science and Mathematics Education (SESAME). The first half of the book focuses on number theory, beginning with the rules of arithmetic (axioms for
the integers). The authors then present all the basic ideas and applications of divisibility, primes, and modular arithmetic. They also introduce the abstract notion of a group and include numerous examples. The final topics on number theory consist of rational numbers, real numbers, and ideas about infinity. Moving on to geometry, the text covers polygons and polyhedra, including the construction of regular polygons and regular polyhedra. It studies tessellation by looking at patterns in the plane, especially those made by regular polygons or sets of regular polygons. The text also determines the symmetry groups of these figures and patterns, demonstrating how groups arise in both geometry and number theory. The book is suitable for pre-service or in-service training for elementary school teachers, general education mathematics or math for liberal arts undergraduate-level courses, and enrichment activities for high school students or math clubs.

The Queen of Mathematics - Jay Goldman 1997-11-15 This book takes the unique approach of examining number theory as it emerged in the 17th through 19th centuries. It leads to an understanding of today's research problems on the basis of their historical development. This book is a contribution to cultural history and brings a difficult subject within the reach of the serious reader.

A Classical Introduction to Modern Number Theory - K. Ireland 2013-03-09 This book is a revised and greatly expanded version of our book Elements of Number Theory published in 1972. As with the first book the primary audience we envisage consists of upper level undergraduate mathematics majors and graduate students. We have assumed some familiarity with the material in a standard undergraduate course in abstract algebra. A large portion of Chapters 1-11 can be read even without such background with the aid of a small amount of
supplementary reading. The later chapters assume some knowledge of Galois theory, and in Chapters 16 and 18 an acquaintance with the theory of complex variables is necessary. Number theory is an ancient subject and its content is vast. Any introductory book must, of necessity, make a very limited selection from the fascinating array of possible topics. Our focus is on topics which point in the direction of algebraic number theory and arithmetic algebraic geometry. By a careful selection of subject matter we have found it possible to exposit some rather advanced material without requiring very much in the way of technical background. Most of this material is classical in the sense that it was discovered during the nineteenth century and earlier, but it is also modern because it is intimately related to important research going on at the present time.

A Conversational Introduction to Algebraic Number Theory: Arithmetic

Beyond Z-Paul Pollack
2017-08-01 Gauss famously referred to mathematics as the “queen of the sciences” and to number theory as the “queen of mathematics”. This book is an introduction to algebraic number theory, meaning the study of arithmetic in finite extensions of the rational number field \( \mathbb{Q} \). Originating in the work of Gauss, the foundations of modern algebraic number theory are due to Dirichlet, Dedekind, Kronecker, Kummer, and others. This book lays out basic results, including the three “fundamental theorems”: unique factorization of ideals, finiteness of the class number, and Dirichlet’s unit theorem. While these theorems are by now quite classical, both the text and the exercises allude frequently to more recent developments. In addition to traversing the main highways, the book reveals some remarkable vistas by exploring scenic side roads. Several topics appear that are not present in the usual introductory texts. One example is the inclusion of an extensive discussion of the theory of elasticity, which
provides a precise way of measuring the failure of unique factorization. The book is based on the author's notes from a course delivered at the University of Georgia; pains have been taken to preserve the conversational style of the original lectures.

**Number Theory**-Benjamin Fine 2007-06-04 This book provides an introduction and overview of number theory based on the distribution and properties of primes. This unique approach provides both a firm background in the standard material as well as an overview of the whole discipline. All the essential topics are covered: fundamental theorem of arithmetic, theory of congruences, quadratic reciprocity, arithmetic functions, and the distribution of primes. Analytic number theory and algebraic number theory both receive a solid introductory treatment. The book’s user-friendly style, historical context, and wide range of exercises make it ideal for self study and classroom use.

**Introduction to Number Theory**-Richard Michael Hill 2017-12-04 Introduction to Number Theory is dedicated to concrete questions about integers, to place an emphasis on problem solving by students. When undertaking a first course in number theory, students enjoy actively engaging with the properties and relationships of numbers. The book begins with introductory material, including uniqueness of factorization of integers and polynomials. Subsequent topics explore quadratic reciprocity, Hensel's Lemma, p-adic powers series such as \( \exp(px) \) and \( \log(1+px) \), the Euclidean property of some quadratic rings, representation of integers as norms from quadratic rings, and Pell's equation via continued fractions. Throughout the five chapters and more than 100 exercises and solutions, readers gain the advantage of a number theory book that focuses on doing calculations. This textbook is a valuable resource for undergraduates or those with a background in university level mathematics.
Trigonometric Sums in Number Theory and Analysis - Gennady I. Arkhipov
2004-01-01
The book presents the theory of multiple trigonometric sums constructed by the authors. Following a unified approach, the authors obtain estimates for these sums similar to the classical I. M. Vinogradov’s estimates and use them to solve several problems in analytic number theory. They investigate trigonometric integrals, which are often encountered in physics, mathematical statistics, and analysis, and in addition they present purely arithmetic results concerning the solvability of equations in integers.

Algebraic Number Theory - Serge Lang
2013-06-29
This is a second edition of Lang’s well-known textbook. It covers all of the basic material of classical algebraic number theory, giving the student the background necessary for the study of further topics in algebraic number theory, such as cyclotomic fields, or modular forms. "Lang's books are always of great value for the graduate student and the research mathematician. This updated edition of Algebraic number theory is no exception."—MATHEMATICAL REVIEWS

Recent Perspectives in Random Matrix Theory and Number Theory - F. Mezzadri
2005-06-21
Provides a grounding in random matrix techniques applied to analytic number theory.

Topics in Number Theory - Amir Hossein Parvardi
2018-09-11
This challenging book contains fundamentals of elementary number theory as well as a huge number of solved problems and exercises. The authors, who are experienced mathematical olympiad teachers, have used numerous solved problems and examples in the process of presenting the theory. Another point which has made this book self-contained is that the authors have explained everything from the
very beginning, so that the reader does not need to use other sources for definitions, theorems, or problems. On the other hand, Topics in Number Theory introduces and develops advanced subjects in number theory which may not be found in other similar number theory books; for instance, chapter 5 presents Thue's lemma, Vietta jumping, and lifting the exponent lemma (among other things) which are unique in the sense that no other book covers all such topics in one place. As a result, this book is suitable for both beginners and advanced-level students in olympiad number theory, math teachers, and in general whoever is interested in learning number theory. For more information about the book, please refer to https://TopicsInNumberTheory.com.

Number Theory
Pommersheim 2011-09-23
Number Theory: A Lively Introduction with Proofs, Applications, and Stories, is a new book that provides a rigorous yet accessible introduction to elementary number theory along with relevant applications. Readable discussions motivate new concepts and theorems before their formal definitions and statements are presented. Many theorems are preceded by Numerical Proof Previews, which are numerical examples that will help give students a concrete understanding of both the statements of the theorems and the ideas behind their proofs, before the statement and proof are formalized in more abstract terms. In addition, many applications of number theory are explained in detail throughout the text, including some that have rarely (if ever) appeared in textbooks. A unique feature of the book is that every chapter includes a math myth, a fictional story that introduces an important number theory topic in a friendly, inviting manner. Many of the exercise sets include in-depth Explorations, in which a series of exercises develop a topic that is related to the material in the section.

The Real Number System
in an Algebraic Setting
J. B. Roberts 2018-03-21
Proceeding from a review of the natural numbers to the positive rational numbers, this text advances to the nonnegative real numbers and the set of all real numbers. 1962 edition.

**Quadratic Number Theory: An Invitation to Algebraic Methods in the Higher Arithmetic** - J. L. Lehman

2019-02-13 Quadratic Number Theory is an introduction to algebraic number theory for readers with a moderate knowledge of elementary number theory and some familiarity with the terminology of abstract algebra. By restricting attention to questions about squares the author achieves the dual goals of making the presentation accessible to undergraduates and reflecting the historical roots of the subject. The representation of integers by quadratic forms is emphasized throughout the text. Lehman introduces an innovative notation for ideals of a quadratic domain that greatly facilitates computation and he uses this to particular effect. The text has an unusual focus on actual computation. This focus, and this notation, serve the author's historical purpose as well; ideals can be seen as number-like objects, as Kummer and Dedekind conceived of them. The notation can be adapted to quadratic forms and provides insight into the connection between quadratic forms and ideals. The computation of class groups and continued fraction representations are featured—the author's notation makes these computations particularly illuminating. Quadratic Number Theory, with its exceptionally clear prose, hundreds of exercises, and historical motivation, would make an excellent textbook for a second undergraduate course in number theory. The clarity of the exposition would also make it a terrific choice for independent reading. It will be exceptionally useful as a fruitful launching pad for undergraduate research projects in algebraic number theory.

**Number Theory and Geometry: An Introduction**
Geometry and the theory of numbers are as old as some of the oldest historical records of humanity. Ever since antiquity, mathematicians have discovered many beautiful interactions between the two subjects and recorded them in such classical texts as Euclid's Elements and Diophantus's Arithmetica. Nowadays, the field of mathematics that studies the interactions between number theory and algebraic geometry is known as arithmetic geometry. This book is an introduction to number theory and arithmetic geometry, and the goal of the text is to use geometry as the motivation to prove the main theorems in the book. For example, the fundamental theorem of arithmetic is a consequence of the tools we develop in order to find all the integral points on a line in the plane. Similarly, Gauss's law of quadratic reciprocity and the theory of continued fractions naturally arise when we attempt to determine the integral points on a curve in the plane given by a quadratic polynomial equation. After an introduction to the theory of diophantine equations, the rest of the book is structured in three acts that correspond to the study of the integral and rational solutions of linear, quadratic, and cubic curves, respectively. This book describes many applications including modern applications in cryptography; it also presents some recent results in arithmetic geometry. With many exercises, this book can be used as a text for a first course in number theory or for a subsequent course on arithmetic (or diophantine) geometry at the junior-senior level.