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# Elementary Number Theory By James K Strayer Waveland

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Elementary Number Theory  
An Invitation to Modern Number Theory  
Structures, Examples, and Problems  
Problems in Algebraic Number Theory  
Not Always Buried Deep  
Elementary Number Theory and Its Applications  
A Modern Introduction To Classical Number Theory  
Number Theory and Geometry: An Introduction to Arithmetic Geometry  
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Introduction to Analytic Number Theory  
Second English Edition (edited by A. Schinzel)  
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Elementary Number Theory in Nine Chapters  
Number Theory and Its History

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**VALENCIA STEPHENS**


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Elementary Number Theory Springer Science & Business Media

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.

*An Invitation to Modern Number Theory* Academic Press

An undergraduate-level 2003 introduction whose only prerequisite is a standard calculus course.

Structures, Examples, and Problems

Elsevier Publishing Company

"This book is the first volume of a two-volume textbook for undergraduates and is indeed the crystallization of a course offered by the author at the California Institute of Technology to undergraduates without any previous

knowledge of number theory. For this reason, the book starts with the most elementary properties of the natural integers. Nevertheless, the text succeeds in presenting an enormous amount of material in little more than 300 pages."—MATHEMATICAL REVIEWS

Problems in Algebraic Number Theory

Springer Science & Business Media

This book serves as a one-semester introductory course in number theory. Throughout the book, Tattersall adopts a historical perspective and gives emphasis to some of the subject's applied aspects, highlighting the field of cryptography. At the heart of the book are the major number theoretic accomplishments of Euclid, Fermat, Gauss, Legendre, and Euler, and to fully illustrate the properties of numbers and concepts developed in the text, a wealth of exercises has been included. The reader should have "pencil in hand" and ready access to a calculator or computer. For students new to number theory, whatever their background, this is a stimulating and entertaining introduction to the subject.

Not Always Buried Deep Princeton University Press

Elementary Number Theory, Gove Effinger, Gary L. Mullen This text is intended to be used as an undergraduate introduction to the theory of numbers. The authors have been immersed in this area of mathematics for many years and hope that this text will inspire students (and instructors) to study, understand, and come to love this truly beautiful subject. Each chapter, after an introduction, develops a new topic clearly broken out in sections which include theoretical material together with numerous examples, each worked out in considerable detail. At the end of each chapter, after a summary of

the topic, there are a number of solved problems, also worked out in detail, followed by a set of supplementary problems. These latter problems give students a chance to test their own understanding of the material; solutions to some but not all of them complete the chapter. The first eight chapters discuss some standard material in elementary number theory. The remaining chapters discuss topics which might be considered a bit more advanced. The text closes with a chapter on Open Problems in Number Theory. Students (and of course instructors) are strongly encouraged to study this chapter carefully and fully realize that not all mathematical issues and problems have been resolved! There is still much to be learned and many questions to be answered in mathematics in general and in number theory in particular.

Elementary Number Theory and Its Applications American Mathematical Soc. In this volume one finds basic techniques from algebra and number theory (e.g. congruences, unique factorization domains, finite fields, quadratic residues, primality tests, continued fractions, etc.) which in recent years have proven to be extremely useful for applications to cryptography and coding theory. Both cryptography and codes have crucial applications in our daily lives, and they are described here, while the complexity problems that arise in implementing the related numerical algorithms are also taken into due account. Cryptography has been developed in great detail, both in its classical and more recent aspects. In particular public key cryptography is extensively discussed, the use of algebraic geometry, specifically of elliptic curves over finite fields, is illustrated, and a final chapter is devoted to quantum cryptography, which is the

new frontier of the field. Coding theory is not discussed in full; however a chapter, sufficient for a good introduction to the subject, has been devoted to linear codes. Each chapter ends with several complements and with an extensive list of exercises, the solutions to most of which are included in the last chapter. Though the book contains advanced material, such as cryptography on elliptic curves, Goppa codes using algebraic curves over finite fields, and the recent AKS polynomial primality test, the authors' objective has been to keep the exposition as self-contained and elementary as possible. Therefore the book will be useful to students and researchers, both in theoretical (e.g. mathematicians) and in applied sciences (e.g. physicists, engineers, computer scientists, etc.) seeking a friendly introduction to the important subjects treated here. The book will also be useful for teachers who intend to give courses on these topics.

*A Modern Introduction To Classical Number Theory* American Mathematical Soc.

Number theory is one of the few areas of mathematics where problems of substantial interest can be fully described to someone with minimal mathematical background. Solving such problems sometimes requires difficult and deep methods. But this is not a universal phenomenon; many engaging problems can be successfully attacked with little more than one's mathematical bare hands. In this case one says that the problem can be solved in an elementary way. Such elementary methods and the problems to which they apply are the subject of this book. Not Always Buried Deep is designed to be read and enjoyed by those who wish to explore elementary methods in modern

number theory. The heart of the book is a thorough introduction to elementary prime number theory, including Dirichlet's theorem on primes in arithmetic progressions, the Brun sieve, and the Erdos-Selberg proof of the prime number theorem. Rather than trying to present a comprehensive treatise, Pollack focuses on topics that are particularly attractive and accessible. Other topics covered include Gauss's theory of cyclotomy and its applications to rational reciprocity laws, Hilbert's solution to Waring's problem, and modern work on perfect numbers. The nature of the material means that little is required in terms of prerequisites: The reader is expected to have prior familiarity with number theory at the level of an undergraduate course and a first course in modern algebra (covering groups, rings, and fields). The exposition is complemented by over 200 exercises and 400 references.

*Number Theory and Geometry: An Introduction to Arithmetic Geometry*  
Allied Publishers

Essentials of Elementary School Mathematics is an introductory text on the essentials of mathematics taught in elementary schools. It presents a systematic development of the mathematics of arithmetic. A primary objective is to give students a background sufficient to understand and answer at an appropriate level the various quite penetrating questions asked by young students. Some examples and exercises are concerned primarily with pedagogical aspects of arithmetic. Comprised of 14 chapters, this book begins with an overview of the language of mathematics, focusing on concepts such as the conjunction (and); negation (not); disjunction (or); and conditional (if...then...). The discussion

then turns to the theory of sets; the concept of binary operations; and recognition and identification of properties of various relations. The next section deals with the number systems of arithmetic: whole numbers, integers, rational numbers, and real numbers. Number theory and clock arithmetic are also examined, along with counting techniques and probability. The final section is devoted to motion geometry and analytic geometry. This monograph should be of interest to students and teachers of mathematics at the elementary level.

**Elementary Number Theory** CRC Press

Natural numbers are the oldest human invention. This book describes their nature, laws, history and current status. It has seven chapters. The first five chapters contain not only the basics of elementary number theory for the convenience of teaching and continuity of reading, but also many latest research results. The first time in history, the traditional name of the Chinese Remainder Theorem is replaced with the Qin Jiushao Theorem in the book to give him a full credit for his establishment of this famous theorem in number theory. Chapter 6 is about the fascinating congruence modulo an integer power, and Chapter 7 introduces a new problem extracted by the author from the classical problems of number theory, which is out of the combination of additive number theory and multiplicative number theory. One feature of the book is the supplementary material after each section, there by broadening the reader's knowledge and imagination. These contents either discuss the rudiments of some aspects or introduce new problems or conjectures and their extensions, such

as perfect number problem, Egyptian fraction problem, Goldbach's conjecture, the twin prime conjecture, the  $3x + 1$  problem, Hilbert Waring problem, Euler's conjecture, Fermat's Last Theorem, Landau's problem and etc. This book is written for anyone who loves natural numbers, and it can also be read by mathematics majors, graduate students, and researchers. The book contains many illustrations and tables. Readers can appreciate the author's sensitivity of history, broad range of knowledge, and elegant writing style, while benefiting from the classical works and great achievements of masters in number theory.

Springer Science & Business Media

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.

*Elements of Number Theory* Cambridge University Press

This is the eBook of the printed book and may not include any media, website access codes, or print supplements that may come packaged with the bound book. *Elementary Number Theory*, Sixth Edition, blends classical theory with modern applications and is notable for its outstanding exercise sets. A full range of exercises, from basic to challenging, helps readers explore key concepts and push their understanding to new heights. Computational exercises and computer projects are also available. Reflecting many years of professors' feedback, this edition offers new examples, exercises, and applications, while incorporating advancements and discoveries in number theory made in the past few years.

**Elementary Theory of Numbers** Jones & Bartlett Learning

This introductory textbook takes a problem-solving approach to number theory, situating each concept within the framework of an example or a problem for solving. Starting with the essentials, the text covers divisibility, unique factorization, modular arithmetic and the Chinese Remainder Theorem, Diophantine equations, binomial coefficients, Fermat and Mersenne primes and other special numbers, and special sequences. Included are sections on mathematical induction and the pigeonhole principle, as well as a discussion of other number systems. By

emphasizing examples and applications the authors motivate and engage readers.

### **Elements of Number Theory**

Elementary Number Theory

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.

Elementary Number Theory Waveland Press

Building on the success of the first edition, *An Introduction to Number Theory with Cryptography, Second Edition*, increases coverage of the popular and important topic of cryptography, integrating it with traditional topics in number theory. The authors have written the text in an engaging style to reflect number theory's increasing popularity. The book is designed to be used by sophomore, junior, and senior undergraduates, but it is also accessible to advanced high school students and is appropriate for independent study. It includes a few more advanced topics for students who wish to explore beyond the traditional

curriculum. Features of the second edition include Over 800 exercises, projects, and computer explorations Increased coverage of cryptography, including Vigenere, Stream, Transposition, and Block ciphers, along with RSA and discrete log-based systems "Check Your Understanding" questions for instant feedback to students New Appendices on "What is a proof?" and on Matrices Select basic (pre-RSA) cryptography now placed in an earlier chapter so that the topic can be covered right after the basic material on congruences Answers and hints for odd-numbered problems About the Authors: Jim Kraft received his Ph.D. from the University of Maryland in 1987 and has published several research papers in algebraic number theory. His previous teaching positions include the University of Rochester, St. Mary's College of California, and Ithaca College, and he has also worked in communications security. Dr. Kraft currently teaches mathematics at the Gilman School. Larry Washington received his Ph.D. from Princeton University in 1974 and has published extensively in number theory, including books on cryptography (with Wade Trappe), cyclotomic fields, and elliptic curves. Dr. Washington is currently Professor of Mathematics and Distinguished Scholar-Teacher at the University of Maryland.

*Introduction to Analytic Number Theory*

W H Freeman & Company

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

Second English Edition (edited by A. Schinzel) CRC Press

This book serves as a one-semester introductory course in number theory. Throughout the book, Tattersall adopts a historical perspective and gives emphasis to some of the subject's applied aspects, highlighting the field of cryptography. At the heart of the book are the major number theoretic accomplishments of Euclid, Fermat, Gauss, Legendre, and Euler, and to fully illustrate the properties of numbers and concepts developed in the text, a wealth of exercises has been included. The reader should have "pencil in hand" and ready access to a calculator or computer. For students new to number theory, whatever their background, this is a stimulating and entertaining introduction to the subject.

*Elementary Theory of Numbers* Courier Corporation

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.

**Elementary Number Theory** Springer Science & Business Media

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.

Elementary Number Theory Cambridge University Press

This problem book gathers together 15 problem sets on analytic number theory that can be profitably approached by anyone from advanced high school students to those pursuing graduate studies. It emerged from a 5-week course taught by the first author as part of the 2019 Ross/Asia Mathematics Program held from July 7 to August 9 in Zhenjiang, China. While it is recommended that the reader has a solid background in mathematical problem solving (as from training for mathematical contests), no possession of advanced subject-matter knowledge is assumed. Most of the solutions require nothing more than elementary number theory and a good grasp of calculus.

Problems touch at key topics like the value-distribution of arithmetic functions, the distribution of prime numbers, the distribution of squares and nonsquares modulo a prime number, Dirichlet's theorem on primes in arithmetic progressions, and more. This book is suitable for any student with a special interest in developing problem-solving skills in analytic number theory. It will be an invaluable aid to lecturers

and students as a supplementary text for introductory Analytic Number Theory courses at both the undergraduate and graduate level.

Second Edition Pearson

These 3 puzzles require proof of a basic law governing the world of numbers. Features van der Waerden's theorem, the Landau-Schnirelmann hypothesis and Mann's theorem, and a solution to Waring's problem. Solutions included.

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