A Friendly Number Theory Solutions

This book of worked-out examples not only accompanies Timothy M. Hagle's earlier book Basic Math for Social Scientists: Concepts, but also provides an informal refresher course in algebra sets, limits and continuity, differential calculus, multivariate functions, partial derivatives, integral calculus, and matrix algebra. Problem sets are also provided so that readers can practice their grasp of standard mathematical procedures.

This introductory text is designed to entice non-math focused individuals into learning some mathematics, while teaching them to think mathematically. Starting with nothing more than basic high school algebra, the reader is gradually led from basic algebra to the point of actively performing mathematical research while getting a glimpse of current mathematical frontiers. The writing style is informal and includes many numerical examples, which are analyzed for patterns and used to make conjectures. The emphasis is on the methods used for proving theorems rather than on specific results. Pythagorean Triples, Linear Equations and the Greatest Common Divisor, Factorization and the Fundamental Theorem of Arithmetic, Congruences, Mersenne Primes, Squares Modulo p, Quadratic Reciprocity, Pell's Equation, Diophantine Approximation, Irrational Numbers and Transcendental Numbers, Sums of Powers, Binomial Coefficients and Pascal's Triangle, Elliptic Curves and Fermat's Last Theorem. For individuals with limited math experience who are interested in number theory.

This volume is the result of a (mainly) instructional conference on arithmetic geometry, held from July 30 through August 10, 1984 at the University of Connecticut in Storrs. This volume contains expanded versions of almost all the instructional lectures given during the conference. In addition to these expository lectures, this volume contains a translation into English of Falt ings' seminal paper which provided the inspiration for the conference. We thank Professor Faltings for his permission to publish the translation and Edward Shipz who did the translation. We thank all the people who spoke at the Storrs conference, both for helping to make it a successful meeting and enabling us to publish this volume. We would especially like to thank David Rohrlich, who delivered the lectures on height functions (Chapter VI) when the second editor was unavoidably detained. In addition to the editors, Michael Artin and John Tate served on the organizing committee for the conference and much of the success of the conference was due to them-our thanks go to them for their assistance. Finally, the conference was only made possible through generous grants from the Vaughn Foundation and the National Science Foundation.

Now in its second edition, this textbook provides an introduction and overview of number theory based on the density and properties of the prime numbers. This unique approach offers both a firm background in the standard material of number theory, as well as an overview of the entire discipline. All of the essential topics are covered, such as the fundamental theorem of arithmetic, theory of congruences, quadratic reciprocity, arithmetic functions, and the distribution of primes. New in this edition are coverage of p-adic numbers, Hensel's lemma, multiple zeta-values, and elliptic curve methods in primality testing. Key topics and features include: A solid introduction to analytic number theory, including full proofs of Dirichlet's Theorem and the Prime Number Theorem Concise treatment of algebraic number theory, including a complete presentation of primes, prime factorizations in algebraic number fields, and unique factorization of ideals Discussion of the AKS algorithm, which shows that primality testing is one of polynomial time, a topic not usually included in such texts Many interesting ancillary topics, such as primality testing and cryptography, Fermat and Mersenne numbers, and Carmichael numbers The user-friendly style, historical context, and wide range of exercises that range from simple to quite difficult (with solutions and hints provided for select exercises) make Number Theory: An Introduction via the Density of Primes ideal for both self-study and classroom use. Intended for upper level undergraduates and beginning graduates, the only prerequisites are a basic knowledge of calculus, multivariable calculus, and some linear algebra. All necessary concepts from abstract algebra and complex analysis are introduced where needed.

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.

This book highlights the many ideas and algorithms that Peter L. Montgomery has contributed to computational number theory and cryptography.

Friendly Introduction to Number Theory, A,Pearson Higher Ed

The Moscow Mathematical Olympiad has been challenging high school students with stimulating, original problems of different degrees of difficulty for over 75 years. The problems are nonstandard; solving them takes wit, thinking outside the box, and, sometimes, hours of contemplation. Some are within the reach of most mathematically competent high school students, while others are difficult even for a mathematics professor. Many mathematically inclined students have found that tackling these problems, or even just reading their solutions, is a great way to develop mathematical insight. In 2006 the Moscow Center for Continuous Mathematical Education began publishing a collection of problems from the Moscow Mathematical Olympiads, providing for each an answer (and sometimes a hint) as well as one or more detailed solutions. This volume represents the years 1993-1999. The problems and the accompanying material are well suited for math circles. They are also appropriate for problem-solving classes and practice for regional and national mathematics competitions. In the interest of fostering a greater awareness and appreciation of mathematics and its connections to other disciplines and everyday life, MSRI and the AMS are publishing books in the Mathematical Circles Library series as a service to young people, their parents and teachers, and the mathematics profession. Titles in this series are co-published with the Mathematical Sciences Research Institute (MSRI).

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.

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.

One of the oldest branches of mathematics, number theory is a vast field devoted to studying the properties of whole numbers. Offering a flexible format for a one- or two-semester course, Introduction to Number Theory uses worked examples, numerous exercises, and two popular software packages to describe a diverse array of number theory topics. This classroom-tested, student-friendly text covers a wide range of subjects, from the ancient Euclidean algorithm for finding the greatest common divisor of two integers to recent developments that include cryptography, the theory of elliptic curves, and the negative solution of Hilbert’s tenth problem. The authors illustrate the connections between number theory and other areas of mathematics, including algebra, analysis, and combinatorics. They also describe applications of number theory to real-world problems, such as congruences in the ISBN system, modular arithmetic and Euler’s theorem in RSA encryption, and quadratic residues in the construction of tournaments. The book interweaves the theoretical development of the material with Mathematica® and MapleTM calculations while giving brief tutorials on the software in the appendices. Highlighting both fundamental and advanced topics, this introduction

provides all of the tools to achieve a solid foundation in number theory.
The two-volume set LNCS 10677 and LNCS 10678 constitutes the refereed proceedings of the 15th International Conference on Theory of Cryptography, TCC 2017, held in Baltimore, MD, USA, in November 2017. The total of 51 revised full papers presented in the proceedings were carefully reviewed and selected from 150 submissions. The Theory of Cryptography Conference deals with the paradigms, approaches, and techniques used to conceptualize natural cryptographic problems and provide algorithmic solutions to them and much more.
Number theory is one of the oldest branches of mathematics that is primarily concerned with positive integers. While it has long been studied for its beauty and elegance as a branch of pure mathematics, it has seen a resurgence in recent years with the advent of the digital world for its modern applications in both computer science and cryptography. Number Theory: Step by Step is an undergraduate-level introduction to number theory that assumes no prior knowledge, but works to gradually increase the reader's confidence and ability to tackle more difficult material. The strength of the text is in its large number of examples and the step-by-step explanation of each topic as it is introduced to help aid understanding the abstract mathematics of number theory. It is compiled in such a way that allows self-study, with explicit solutions to all the set of problems freely available online via the companion website. Punctuating the text are short and engaging historical profiles that add context for the topics covered and provide a dynamic background for the subject matter.
In this student-friendly text, Strayer presents all of the topics necessary for a first course in number theory. Additionally, chapters on primitive roots, Diophantine equations, and continued fractions allow instructors the flexibility to tailor the material to meet their own classroom needs. Each chapter concludes with seven Student Projects, one of which always involves programming a calculator or computer. All of the projects not only engage students in solving number-theoretical problems but also help familiarize them with the relevant mathematical literature.
"Ten-frames are a model to help students efficiently gain and develop an understanding of addition and subtraction. The classroom-tested routines, games, and problem-solving lessons in this book use ten-frames to develop students' natural strategies for adding numbers and fit into any set of state standards or curriculum"--Provided by publisher.
This book constitutes the refereed proceedings of the 7th International Algorithmic Number Theory Symposium, ANTS 2006, held in Berlin, Germany in July 2006. The 37 revised full papers presented together with 4 invited papers were carefully reviewed and selected for inclusion in the book. The papers are organized in topical sections on algebraic number theory, analytic and elementary number theory, lattices, curves and varieties over fields of characteristic zero, curves over finite fields and applications, and discrete logarithms.
This reference serves as a reader-friendly guide to every basic tool and skill required in the mathematical library and helps mathematicians find resources in any format in the mathematics literature. It lists a wide range of standard texts, journals, review articles, newsgroups, and Internet and database tools for every major subfield in mathematics and details methods of access to primary literature sources of new research, applications, results, and techniques. Using the Mathematics Literature is the most comprehensive and up-to-date resource on mathematics literature in both print and electronic formats, presenting time-saving strategies for retrieval of the latest information.
This book focuses more on the “why” reasons behind math number relationships, explained in plain English and with images that show number relationships.
The Moscow Mathematical Olympiad has been challenging high school students with stimulating, original problems of different degrees of difficulty for over 75 years. The problems are nonstandard; solving them takes wit, thinking outside the box, and, sometimes, hours of contemplation. Some are within the reach of most mathematically competent high school students, while others are difficult even for a mathematics professor. Many mathematically inclined students have found that tackling these problems, or even just reading their solutions, is a great way to develop mathematical insight. In 2006 the Moscow Center for Continuous Mathematical Education began publishing a collection of problems from the Moscow Mathematical Olympiads, providing for each an answer (and sometimes a hint) as well as one or more detailed solutions. This volume represents the years 2000-2005. The problems and the accompanying material are well suited for math circles. They are also appropriate for problem-solving classes and practice for regional and national mathematics competitions. In the interest of fostering a greater awareness and appreciation of mathematics and its connections to other disciplines and everyday life, MSRI and the AMS are publishing books in the Mathematical Circles Library series as a service to young people, their parents and teachers, and the mathematics profession. Titles in this series are co-published with the Mathematical Sciences Research Institute (MSRI).
At the intersection of mathematics, computer science, and philosophy, mathematical logic examines the power and limitations of formal mathematical thinking. In this expansion of Leary's user-friendly 1st edition, readers with no previous study in the field are introduced to the basics of model theory, proof theory, and computability theory. The text is designed to be used either in an upper division undergraduate classroom, or for self study. Updating the 1st Edition's treatment of languages, structures, and deductions, leading to rigorous proofs of Godel's First and Second Incompleteness Theorems, the expanded 2nd Edition includes a new introduction to incompleteness through computability as well as solutions to selected exercises.
Number theory is the branch of mathematics concerned with the counting numbers, 1, 2, 3, … and their multiples and factors. Of particular importance are odd and even numbers, squares and cubes, and prime numbers. But in spite of their simplicity, you will meet a multitude of topics in this book: magic squares, cryptarithms, finding the day of the week for a given date, constructing regular polygons, pythagorean triples, and many more. In this revised edition, John Watkins and Robin Wilson have updated the text to bring it in line with contemporary developments. They have added new material on Fermat's Last Theorem, the role of computers in number theory, and the use of number theory in cryptography, and have made numerous minor changes in the presentation and layout of the text and the exercises.
This book primarily serves as a historical research monograph on the biographical sketch and career of Leonhard Euler and his major contributions to numerous areas in the mathematical and physical sciences. It contains fourteen chapters describing Euler?s works on number theory, algebra, geometry, trigonometry, differential and integral calculus, analysis, infinite series and infinite products, ordinary and elliptic integrals and special functions, ordinary and partial differential equations, calculus of variations, graph theory and topology, mechanics and ballistic research, elasticity and fluid mechanics, physics and astronomy, probability and statistics. The book is written to provide a definitive impression of Euler?s personal and professional life as well as of the range, power, and depth of his unique contributions. This tricentennial tribute commemorates Euler the great man and Euler the universal mathematician of all time. Based on the author's historically motivated method of teaching, special attention is given to demonstrate that Euler?s work had served as the basis of research and developments of mathematical and physical sciences for the last 300 years. An attempt is also made to examine his research and its relation to current mathematics and science. Based on a series of Euler?s extraordinary contributions, the historical development of many different subjects of mathematical sciences is traced with a linking commentary so that it puts the reader at the forefront of current research.
As the structure and behavior of molecules and crystals depend on their different symmetries, group theory becomes an essential tool in many important areas of chemistry. It is a quite powerful theoretical tool to predict many basic as well as some characteristic properties of

molecules. Whereas quantum mechanics provide solutions of some chemical problems on the basis of complicated mathematics, group theory puts forward these solutions in a very simplified and fascinating manner. Group theory has been successfully applied to many chemical problems. Students and teachers of chemical sciences have an invisible fear from this subject due to the difficulty with the mathematical jugglery. An active sixth dimension is required to understand the concept as well as to apply it to solve the problems of chemistry. This book avoids mathematical complications and presents group theory so that it is accessible to students as well as faculty and researchers. Chemical Applications of Symmetry and Group Theory discusses different applications to chemical problems with suitable examples. The book develops the concept of symmetry and group theory, representation of group, its applications to I.R. and Raman spectroscopy, U.V spectroscopy, bonding theories like molecular orbital theory, ligand field theory, hybridization, and more. Figures are included so that reader can visualize the symmetry, symmetry elements, and operations.

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

Written in a lively, engaging style by the author of popular mathematics books, this volume features nearly 1,000 imaginative exercises and problems. Some solutions included. 1978 edition.

This is a semi-popular mathematics book aimed at a broad readership of mathematically literate scientists, especially mathematicians and physicists who are not experts in classical mechanics or KAM theory, and scientific-minded readers. Parts of the book should also appeal to less mathematically trained readers with an interest in the history or philosophy of science. The scope of the book is broad: it not only describes KAM theory in some detail, but also presents its historical context (thus showing why it was a “breakthrough”). Also discussed are applications of KAM theory (especially to celestial mechanics and statistical mechanics) and the parts of mathematics and physics in which KAM theory resides (dynamical systems, classical mechanics, and Hamiltonian perturbation theory). Although a number of sources on KAM theory are now available for experts, this book attempts to fill a long-standing gap at a more descriptive level. It stands out very clearly from existing publications on KAM theory because it leads the reader through an accessible account of the theory and places it in its proper context in mathematics, physics, and the history of science.

The theory of elliptic curves is distinguished by its long history and by the diversity of the methods that have been used in its study. This book treats the arithmetic approach in its modern formulation, through the use of basic algebraic number theory and algebraic geometry. Following a brief discussion of the necessary algebro-geometric results, the book proceeds with an exposition of the geometry and the formal group of elliptic curves, elliptic curves over finite fields, the complex numbers, local fields, and global fields. Final chapters deal with integral and rational points, including Siegels theorem and explicit computations for the curve Y = X + DX, while three appendices conclude the whole: Elliptic Curves in Characteristics 2 and 3, Group Cohomology, and an overview of more advanced topics.

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. A Friendly Introduction to Number Theory, Fourth Edition is designed to introduce readers to the overall themes and methodology of mathematics through the detailed study of one particular facet—number theory. Starting with nothing more than basic high school algebra, readers are gradually led to the point of actively performing mathematical research while getting a glimpse of current mathematical frontiers. The writing is appropriate for the undergraduate audience and includes many numerical examples, which are analyzed for patterns and used to make conjectures. Emphasis is on the methods used for proving theorems rather than on specific results.

This volume contains the proceedings of the International Conference on Vertex Operator Algebras, Number Theory, and Related Topics, held from June 11–15, 2018, at California State University, Sacramento, California. The mathematics of vertex operator algebras, vector-valued modular forms and finite group theory continues to provide a rich and vibrant landscape in mathematics and physics. The resurgence of moonshine related to the Mathieu group and other groups, the increasing role of algebraic geometry and the development of irrational vertex operator algebras are just a few of the exciting and active areas at present. The proceedings center around active research on vertex operator algebras and vector-valued modular forms and offer original contributions to the areas of vertex algebras and number theory, surveys on some of the most important topics relevant to these fields, introductions to new fields related to these and open problems from some of the leaders in these areas.

Tackle the tricky issue of bridging the communication gap between teachers, students, and their parents. This unique resource explore the various channels--newsletters, back-to-school-night presentations, homework, and more--through which teachers can communicate with parents about their children’s math education.

"This resource supports new and experienced educators who want to prepare for and design purposeful number talks for their students; the author demonstrates how to develop grade-level-specific strategies for addition, subtraction, multiplication, and division. Includes connections to national standards, a DVD, reproducibles, bibliography, and index"--Provided by publisher.

The Mathematical Olympiad examinations, covering the USA Mathematical Olympiad (USAMO) and the International Mathematical Olympiad (IMO), have been published annually by the MAA American Mathematics Competitions since 1976. The IMO is the world mathematics championship for high school students. It takes place annually in a different country. The IMO competitions help to discover, encourage and challenge mathematically gifted young people all over the world. The USAMO and the Team Selection Test (TST) are the last two stages of the selection process leading to representing the United States of America in the IMO. The preceding examinations are the AMC 10 or AMC 12 and the American Invitational Mathematics Examination (AIME). Participation in the AIME, USAMO, and the TST is by invitation only, based on performance in the preceding exams of the sequence. Through the AMC contests and the IMO, young gifted mathematicians are identified and recognized while they are still in secondary school. Participation in these competitions provides them with the chance to measure themselves against other exceptional students from all over the world. Editors, Andreescu and Feng provide remarkable solutions developed by the examination committees, contestants, and experts, during or after the contests. They also provide a detailed report of the 1995-2000 USAMO/IMO

results, and a comprehensive guide to other materials emphasizing advanced problem-solving. This collection of excellent problems and beautiful solutions is a valuable companion for students who wish to develop their interest in mathematics outside the school curriculum and to deepen their knowledge of mathematics. A Friendly Mathematics Competition tells the story of the Indiana College Mathematics Competition (ICMC) by presenting the problems, solutions, and results of the first 35 years of the ICMC. The ICMC was organized in reaction to the Putnam Exam - its problems were to be more representative of the undergraduate curriculum, and students could work on them in teams. Originally participation was originally restricted to the small, private colleges and universities of the state, but was later opened up to students from all of the schools in Indiana. The competition was quickly nicknamed the ""Friendly"" Competition because of its focus on solving mathematical problems, which brought faculty and students together, rather than on the competitive nature of winning. Organized by year, the problems and solutions in this volume present an excellent archive of information about what has been expected of an undergraduate mathematics major over the past 35 years. With more than 245 problems and solutions, the book is also a must buy for faculty and students interested in problem-solving. The index of problems lists problems in: Algebraic Structures; Analytic Geometry, Arclength, Binomial Coefficients, Derangements, Differentiation, Differential Equations, Diophantine Equations, Enumeration, Field and Ring Theory, Fibonacci Sequences, Finite Sums, Fundamental Theorem of Calculus Geometry, Group Theory, Inequalities, Infinite Series, Integration, Limit Evaluation, Logic, Matrix Algebra, Maxima and Minima Problems, Multivariable Calculus, Number Theory, Permutations, Probability, Polar Coordinates, Polynomials, Real Valued Functions Riemann Sums, Sequences, Systems of Equations, Statistics, Synthetic Geometry, Taylor Series, Trigonometry, and Volumes.
Mathematicians solve equations, or try to. But sometimes the solutions are not as interesting as the beautiful symmetric patterns that lead to them. Written in a friendly style for a general audience, Fearless Symmetry is the first popular math book to discuss these elegant and mysterious patterns and the ingenious techniques mathematicians use to uncover them. Hidden symmetries were first discovered nearly two hundred years ago by French mathematician évariste Galois. They have been used extensively in the oldest and largest branch of mathematics--number theory--for such diverse applications as acoustics, radar, and codes and ciphers. They have also been employed in the study of Fibonacci numbers and to attack well-known problems such as Fermat's Last Theorem, Pythagorean Triples, and the ever-elusive Riemann Hypothesis. Mathematicians are still devising techniques for teasing out these mysterious patterns, and their uses are limited only by the imagination. The first popular book to address representation theory and reciprocity laws, Fearless Symmetry focuses on how mathematicians solve equations and prove theorems. It discusses rules of math and why they are just as important as those in any games one might play. The book starts with basic properties of integers and permutations and reaches current research in number theory. Along the way, it takes delightful historical and philosophical digressions. Required reading for all math buffs, the book will appeal to anyone curious about popular mathematics and its myriad contributions to everyday life.
Solutions manual to accompany Logic and Discrete Mathematics: A Concise Introduction This book features a unique combination of comprehensive coverage of logic with a solid exposition of the most important fields of discrete mathematics, presenting material that has been tested and refined by the authors in university courses taught over more than a decade. Written in a clear and reader-friendly style, each section ends with an extensive set of exercises, most of them provided with complete solutions which are available in this accompanying solutions manual.
This is a book about prime numbers, congruences, secret messages, and elliptic curves that you can read cover to cover. It grew out of undergr- uate courses that the author taught at Harvard, UC San Diego, and the University of Washington. The systematic study of number theory was initiated around 300B. C. when Euclid proved that there are in?nitely 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 972A. 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 secretely 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, publ- key cryptography, attacks on public-key systems, and playing a central role in Andrew Wiles' resolution of Fermat's Last Theorem.
This book contains proceedings presented at the fourth Canadian Number Theory Association (CNTA) conference held at Dalhousie University in July 1994. The invited speakers focused on analytic, algebraic, and computational number theory. The contributed talks represented a wide variety of areas in number theory. Paulo Ribenboim gave an hour-long talk on Fermat's last theorem--which was wide open at the time of the conference. His lecture was entitled Fermat's Last Theorem, Before June 23, 1993. This lecture was open to the public and attracted a large audience from outside the conference. This book contains 34 written versions of the presentations. All papers were refereed.
Provides a smooth and pleasant transition from first-year calculus to upper-level mathematics courses in real analysis, abstract algebra and number theory Most universities require students majoring in mathematics to take a “transition to higher math” course that introduces mathematical proofs and more rigorous thinking. Such courses help students be prepared for higher-level mathematics course from their onset. Advanced Mathematics: A Transitional Reference provides a “crash course” in beginning pure mathematics, offering instruction on a blendof inductive and deductive reasoning. By avoiding outdated methods and countless pages of theorems and proofs, this innovative textbook prompts students to think about the ideas presented in an enjoyable, constructive setting. Clear and concise chapters cover all the essential topics students need to transition from the "rote-orientated" courses of calculus to the more rigorous "proof-

orientated" advanced mathematics courses. Topics include sentential and predicate calculus, mathematical induction, sets and counting, complex numbers, point-set topology, and symmetries, abstract groups, rings, and fields. Each section contains numerous problems for students of various interests and abilities. Ideally suited for a one-semester course, this book: Introduces students to mathematical proofs and rigorous thinking Provides thoroughly class-tested material from the authors own course in transitioning to higher math Strengthens the mathematical thought process of the reader Includes informative sidebars, historical notes, and plentiful graphics Offers a companion website to access a supplemental solutions manual for instructors Advanced Mathematics: A Transitional Reference is a valuable guide for undergraduate students who have taken courses in calculus, differential equations, or linear algebra, but may not be prepared for the more advanced courses of real analysis, abstract algebra, and number theory that await them. This text is also useful for scientists, engineers, and others seeking to refresh their skills in advanced math.

This handbook focuses on some important topics from Number Theory and Discrete Mathematics. These include the sum of divisors function with the many old and new issues on Perfect numbers; Euler's totient and its many facets; the Möbius function along with its generalizations, extensions, and applications; the arithmetic functions related to the divisors or the digits of a number; the Stirling, Bell, Bernoulli, Euler and Eulerian numbers, with connections to various fields of pure or applied mathematics. Each chapter is a survey and can be viewed as an encyclopedia of the considered field, underlining the interconnections of Number Theory with Combinatorics, Numerical mathematics, Algebra, or Probability Theory. This reference work will be useful to specialists in number theory and discrete mathematics as well as mathematicians or scientists who need access to some of these results in other fields of research.