Problems In Algebraic Number Theory 2nd Edition

Number Fields
Transcendental and Algebraic Numbers
Elementary Number Theory
Challenging Problems in Algebra
Algebraic Number Theory
Algebraic Number Theory and Fermat's Last Theorem
A Course in Algebraic Number Theory
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Number Theory
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A Brief Guide to Algebraic Number Theory
Computational Problems, Methods, and Results in Algebraic Number Theory
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Problems In Algebraic Number Theory, 2E

Methods of Solving Number Theory Problems
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The Theory of Algebraic Number Fields
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An Introduction to Algebraic Number Theory
An Invitation to Modern Number Theory
The Theory of Algebraic Numbers
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A Course in Number Theory
A Gateway to Number Theory: Applying the Power of Algebraic Curves
Problems in Algebraic Number Theory

TALAN HALEY

Number Fields
Oxford University Press
First published in 1979 and written by two distinguished mathematicians with a special gift for exposition, this book is now available in a completely revised third edition. It reflects the exciting developments in number theory during the past two decades that culminated in the proof of

Fermat's Last Theorem. Intended as a upper level textbook, it *Transcendental and Algebraic Numbers* American Mathematical Soc. Challenge: Can you find all the integers a, b, c satisfying 2a2+3b2=5c2 ? Looks simple, and there are in fact a number of easy solutions. But most of them turn out to be anything but obvious! There are infinitely many possibilities, and as any computer will tell you, each of a, b, c will usually be large. So the challenge remains ... Find all integers a a, b, c satisfying 2a2+3b2=5c2 A major advance in number theory means this book can give an easy answer to this and countless similar questions. The idea behind the approach is transforming a degree-two equation in integer variables a, b, c into a plane curve defined by a polynomial. Working with the curve makes obtaining solutions far easier, and the geometric solutions then get translated back into integers. This method morphs hard problems into routine ones and typically requires no more than high school math. (The complete solution to 2a2+3b2=5c2 is included in the book.) In addition to equations of degree two, the book addresses

degree-three equations—a branch of number theory that is today something of a cottage industry, and these problems translate into “elliptic curves”. This important part of the book includes many pictures along with the exposition, making the material meaningful and easy to grasp. This book will fit nicely into an introductory course on number theory. In addition, the many solved examples, illustrations, and exercises make self-studying the book an option for students, thus becoming a natural candidate for a capstone course.

Elementary Number Theory

Springer Science & Business Media

Primarily an advanced study of the modern theory of transcendental and algebraic numbers, this treatment by a distinguished Soviet mathematician focuses on the theory's fundamental methods. The text also chronicles the historical development of the theory's methods and explores the connections with other problems in number theory. The problem of approximating algebraic numbers is also studied as a case in the theory of transcendental numbers. Topics include the Thue-Siegel theorem, the Hermite-

Lindemann theorem on the transcendency of the exponential function, and the work of C. Siegel on the transcendency of the Bessel functions and of the solutions of other differential equations. The final chapter considers the Gelfond-Schneider theorem on the transcendency of alpha to the power beta. Each proof is prefaced by a brief discussion of its scheme, which provides a helpful guide to understanding the proof's progression. Challenging Problems in Algebra Courier Corporation This book contains 22 lectures presented at the final conference of the Ger man research program (Schwerpunkt programm) Algorithmic Number The ory and Algebra 1991-1997, sponsored by the Deutsche Forschungsge mein schaft. The purpose of this research program and of the meeting was to bring together developers of computer algebra software and researchers using com putational methods to gain insight into experimental problems and theoret ical questions in algebra and number theory. The book gives an overview on algorithmic methods and on results ob tained during this period. This includes survey articles

on the main research projects within the program: • algorithmic number theory emphasizing class field theory, constructive Galois theory, computational aspects of modular forms and of Drinfeld modules • computational algebraic geometry including real quantifier elimination and real algebraic geometry, and invariant theory of finite groups • computational aspects of presentations and representations of groups, especially finite groups of Lie type and their Heeke algebras, and of the isomorphism problem in group theory. Some of the articles illustrate the current state of computer algebra systems and program packages developed with support by the research program, such as KANT and LiDIA for algebraic number theory, SINGULAR, RED LOG and INVAR for commutative algebra and invariant theory respectively, and GAP, SYSYPHOS and CHEVIE for group theory and representation theory.

Algebraic Number Theory

Springer Science & Business Media

It has become clear that problem solving plays an extremely important role in mathematical research. This

book is a collection of about 500 problems in algebraic number theory. They are systematically arranged to reveal the evolution of concepts and ideas of the subject. For this new edition the authors have added a new chapter and revised several sections. Princeton University Press Updated to reflect current research, Algebraic Number Theory and Fermat's Last Theorem, Fourth Edition introduces fundamental ideas of algebraic numbers and explores one of the most intriguing stories in the history of mathematics —the quest for a proof of Fermat's Last Theorem. The authors use this celebrated theorem to motivate a general study of the theory of algebraic numbers from a relatively concrete point of view. Students will see how Wiles's proof of Fermat's Last Theorem opened many new areas for future work. New to the Fourth Edition Provides up-to-date information on unique prime factorization for real quadratic number fields, especially Harper's proof that $Z(\sqrt{14})$ is Euclidean Presents an important new result: Mihăilescu's proof of the Catalan conjecture of 1844 Revises and expands one chapter into two, covering

classical ideas about modular functions and highlighting the new ideas of Frey, Wiles, and others that led to the long-sought proof of Fermat's Last Theorem Improves and updates the index, figures, bibliography, further reading list, and historical remarks Written by preeminent mathematicians Ian Stewart and David Tall, this text continues to teach students how to extend properties of natural numbers to more general number structures, including algebraic number fields and their rings of algebraic integers. It also explains how basic notions from the theory of algebraic numbers can be used to solve problems in number theory. *Algebraic Number Theory and Fermat's Last Theorem* CRC Press This undergraduate textbook provides an approachable and thorough introduction to the topic of algebraic number theory, taking the reader from unique factorisation in the integers through to the modern-day number field sieve. The first few chapters consider the importance of arithmetic in fields larger than the rational numbers. Whilst some results generalise well, the unique factorisation of the integers in these more general number fields

often fail. Algebraic number theory aims to overcome this problem. Most examples are taken from quadratic fields, for which calculations are easy to perform. The middle section considers more general theory and results for number fields, and the book concludes with some topics which are more likely to be suitable for advanced students, namely, the analytic class number formula and the number field sieve. This is the first time that the number field sieve has been considered in a textbook at this level.

A Course in Algebraic Number Theory

Springer Science & Business Media

This introduction to algebraic number theory via the famous problem of "Fermats Last Theorem" follows its historical development, beginning with the work of Fermat and ending with Kummers theory of "ideal" factorization. The more elementary topics, such as Eulers proof of the impossibilty of x+y=z, are treated in an uncomplicated way, and new concepts and techniques are introduced only after having been motivated by specific problems. The book also covers in detail the application of Kummers theory to quadratic

integers and relates this to Gauss'theory of binary quadratic forms, an interesting and important connection that is not explored in any other book.

Algebraic Number Theory

Courier Corporation

Broad graduate-level account of Algebraic Number Theory, including exercises, by a world-renowned author.

Algebraic Number Theory and Fermat's Last Theorem

Springer Science & Business Media

265 challenging problems in all phases of group theory, gathered for the most part from papers published since 1950, although some classics are included.

Number Theory

Springer Science & Business Media

Bringing the material up to date to reflect modern applications, Algebraic Number Theory, Second Edition has been completely rewritten and reorganized to incorporate a new style, methodology, and presentation. This edition focuses on integral domains, ideals, and unique factorization in the first chapter; field extensions in the second chapter; and

Fermat's Last Theorem

Springer

Algebra plays a fundamental role not only in

mathematics, but also in various other scientific fields. Without algebra there would be no uniform language to express concepts such as numbers' properties. Thus one must be well-versed in this domain in order to improve in other mathematical disciplines. We cover algebra as its own branch of mathematics and discuss important techniques that are also applicable in many Olympiad problems. Number theory too relies heavily on algebraic machinery. Often times, the solutions to number theory problems involve several steps. Such a solution typically consists of solving smaller problems originating from a hypothesis and ending with a concrete statement that is directly equivalent to or implies the desired condition. In this book, we introduce a solid foundation in elementary number theory, focusing mainly on the strategies which come up frequently in junior-level Olympiad problems.

Approximation by Algebraic Numbers

Springer

This edition has been called ‘startlingly up-to-date’, and in this corrected second printing you can be sure that it’s even more

contemporaneous. It surveys from a unified point of view both the modern state and the trends of continuing development in various branches of number theory. Illuminated by elementary problems, the central ideas of modern theories are laid bare. Some topics covered include non-Abelian generalizations of class field theory, recursive computability and Diophantine equations, zeta- and L-functions. This substantially revised and expanded new edition contains several new sections, such as Wiles' proof of Fermat's Last Theorem, and relevant techniques coming from a synthesis of various theories.

A Brief Guide to Algebraic Number Theory World Scientific

A translation of Hilberts "Theorie der algebraischen Zahlkörper" best known as the "Zahlbericht", first published in 1897, in which he provides an elegantly integrated overview of the development of algebraic number theory up to the end of the nineteenth century. The Zahlbericht also provided a firm foundation for further research in the theory, and can be seen as the starting point for all twentieth century investigations into the subject, as well as reciprocity

laws and class field theory. This English edition further contains an introduction by F. Lemmermeyer and N. Schappacher.

Computational Problems, Methods, and Results in Algebraic Number Theory

Courier Corporation

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. *Problems in Analytic Number Theory* Springer Science & Business Media Providing an overview of the state of the art on rationality questions in algebraic geometry, this volume gives an update on the most recent developments. It offers a comprehensive introduction to this fascinating topic, and will certainly become an essential reference for anybody working in the field. Rationality problems are of fundamental importance both in algebra and algebraic geometry. Historically, rationality problems motivated significant developments in the theory of abelian integrals, Riemann surfaces and the Abel–Jacobi map, among other areas, and they have strong links with modern notions such as moduli spaces, Hodge theory, algebraic cycles and derived categories. This text is aimed at researchers and graduate students in algebraic geometry. **Rationality Problems in Algebraic Geometry** American Mathematical Soc. This textbook presents an elementary introduction to number theory and its different aspects: approximation of real

numbers, irrationality and transcendence problems, continued fractions, diophantine equations, quadratic forms, arithmetical functions and algebraic number theory. These topics are covered in 12 chapters and more than 200 solved exercises. Clear, concise, and self-contained, this textbook may be used by undergraduat e and graduate students, as well as highschool mathematics teachers. More generally, it will be suitable for all those who are interested in number theory, this fascinating branch of mathematics. **Number Theory** Springer ltpzf}JlOV, li~oxov uoq>ZUJlCJ. 7:WV Al(JX., llpoj1. AE(Jj1. The first part of this volume is based on a course taught at Princeton University in 1961-62; at that time, an excellent set ofnotes was prepared by David Cantor, and it was originally my intention to make these notes available to the mathematical public with only quite minor changes. Then, among some old papers of mine, I accidentally came across a long-forgotten manuscript by Chevalley, of pre-war vintage (forgotten, that is to say, both by me and by its author) which, to my taste at least, seemed

to have aged very welt It contained abrief but essentially com plete account of the main features of c1assfield theory, both local and global; and it soon became obvious that the usefulness of the intended volume would be greatly enhanced if I inc1uded such a treatment of this topic. It had to be expanded, in accordance with my own plans, but its outline could be preserved without much change. In fact, I have adhered to it rather c10sely at some critical points.

Geometric Methods in Algebra and Number Theory

Springer Science & Business Media

This introduction to algebraic number theory discusses the classical concepts from the viewpoint of Arakelov theory. The treatment of class theory is particularly rich in illustrating complements, offering hints for further study, and providing concrete examples. It is the most up-to-date, systematic, and theoretically comprehensive textbook on algebraic number field theory available.

111 Problems in Algebra and Number Theory

Springer Science & Business Media

The problems are systematically arranged to reveal the evolution of concepts and

ideas of the subject Includes various levels of problems -	some are easy and straightforward, while others	are more challenging All problems are elegantly solved

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