Review of the book

"Introduction to Number Theory"

by Martin Erickson and Anthony Vazzana
Chapman & Hall CRC, 2008

ISBN: 978-1-58488-937-3

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May 2011

1 Summary of the review

Introduction to Number Theory is a well-written book on this important branch of mathematics. The author organizes the work in a very structured way, dividing it into a first part about core topics that starts from the very basics, and a second and a third part regarding advanced topics, such as elliptic curves or Hilbert's tenth problem. The book is hence suitable for a wide range of readers, and the clear, almost story-like structure makes it easy to follow. As a plus, every chapter is correlated with interesting anecdotes about famous mathematicians from the past that gave important contributions to number theory, such as Euler, Gauss, or Euclid. Examples and calculations for two popular softwares like Mathematica and Maple are also provided, as well as an appendix describing how to use them. Strongly recommended to anyone interested in number theory.

2 Summary of the book

Number theory is one of the oldest branches of mathematics, its roots going back to the times of the legendary greek mathematicians such as Euclid or Erathostenes. The importance of this field of study has greatly increased in recent times due to applications, especially in cryptography, that are vital in the modern society.
The book aims to give a detailed introduction to this beautiful subject and to provide the reader a complete and solid understanding of it. It is divided into three main sections.

2.1 Part I

In Part I, the core topics are treated, starting from the very basics (natural numbers, principle of induction) and moving on to fundamental concepts like primes and divisibility (chapter 2), congruences (chapter 3) and quadratic residues (chapter 5). An exception is constituted by chapter 4, which is a brief overview of cryptography and its connection with number theory (ciphers, primes factorisation and the RSA cryptosystem). All of these chapter constitute the foundation and have to be considered as prerequisites for the following chapters.

2.2 Part II

Part II is about further topics in number theory. This includes arithmetic functions (chapter 6), a study of large primes (chapter 7), continued fractions (chapter 8) and diophantine equations (chapter 9).
All of these topics require a greater mathematical maturity and a certain confidence with proofs and notation. Despite the name "further topics", this is still to be considered an essential part of number theory.

2.3 Part III

Part III covers advanced topics and offers a spotlight on important and actual mathematical problems such as the very famous Fermat's Last Theorem (presented in chapter 11) and Hilbert's Tenth Problem (described in chapter 12). The rest of the chapters introduce ideas from analytic number theory (chapter 10) such as the well-known Riemann Zeta Function, an introduction to the theory of elliptic curves, and connections with logic. Knowledge of fundamentals of analysis and algebra is strongly recommended, as well as a cryptographic background (like the one given in chapter 4) for the part about elliptic curves.

2.4 Appendices

Finally, in the end of the book four appendices are provided, respectively about Mathematica basics, Maple basics, Web resources and notation, and the first two are especially useful if the reader has never approached these softwares before.

3 Style of the book

The text is written in a clear and reader-friendly style, and the topics are described carefully and naturally, almost like a story. That makes it easy to follow and very enjoyable.
Throughout the book a wide range of applications to "real-world" problems is presented, relatively to each topic, such as the case of RSA and the ISBN system. Many exercises and worked examples are provided, using both Mathematica and Maple packages. As a plus, almost every chapter is correlated with interesting anecdotes about the great mathematicians of the past that gave a contribution to number theory, from the already cited Euclid and Erathostenes to Euler, Fermat, and Gauss.

4 Would you recommend the book?

The author succeeds in presenting the topics of number theory in a very easy and natural way, and the presence of interesting anecdotes, applications, and recent problems alongside the obvious mathematical rigor makes the book even more appealing. I would certainly recommend it to a vast audience, and it is to be considered a valid and flexible textbook for any undergraduate number theory course.

The reviewer is a PhD student at University of Auckland, New Zealand.

An Introduction to the Theory of Numbers is a classic textbook in the field of number theory, by G. H. Hardy and E. M. Wright. The book grew out of a series of lectures by Hardy and Wright and was first published in 1938. The third edition added an elementary proof of the prime number theorem, and the sixth edition added a chapter on elliptic curves. List of important publications in mathematics. Accordingly, our task was to provide a series of introductory essays to various chapters of number theory, lead-ing the reader from illuminating examples of number theoretic objects and problems, through general notions and theories, developed gradually by many researchers, to some of the highlights of modern mathematics and great, some-times nebulous designs for future generations.Â 503. Introduction. Among the various branches of mathematics, number theory is characterized to a lesser degree by its primary subject (â€œintegersâ€) than by a psychologi-cal attitude. sided theory, but is an introduction, or a series of introductions, to. almost a11 of these sides in turn. We say something about each of a. number of subjects which are not usually combined in a single volume, and about some which are not always regarded as forming part of the. theory of numbers at all. Thus Chs. XII-XV belong to the â€˜algebraicâ€™. theory of numbers, Chs. XIX-XXI. to the â€˜additiveâ€™, and Ch. XXII. to the â€˜analyticâ€™ theories; while Chs. III, XI, XXIII, and XXIV deal. with matters usually classified under the headings of â€˜geometry of. Introduction to Number Theory. So, the notation. xy.Â Introduction to Number Theory. If we just want to nd any two divisors, there may be many ways to do so. Weâ€™d like to be able to nd a list of divisors in such a way that the same list is always found. Instead of looking for any divisors, letâ€™s agree to nd all prime divisors of a number. Introduction to Number Theory. Example: 120 = 12 Â· 10 = 3 Â· 4 Â· 2 Â· 5 = 3 Â· 2 Â· 2 Â· 2 Â· 5. Or, 120 = 2 Â· 60 = 2 Â· 6 Â· 10 = 2 Â· 2 Â· 3 Â· 2 Â· 5. We get the same prime factors, even though we didnâ€™t start with the same initial pair of divisors. Introduction to Number Theory. In fact, this will always be true !! Theo...

Fundamental principles of number theory, including primes and composites, divisors and multiples, divisibility, remainders, modular arithmetic, and number bases. Required Text: Introduction to Number Theory. 12 weeks. Diagnostics.Â A thorough introduction for students in grades 7-10 to topics in number theory such as primes & composites, multiples & divisors, prime factorization and its uses, base numbers, modular arithmetic, divisibility rules, linear congruences, how to develop number sense, and more. VIEW DETAILS. I really loved the course Introduction to Number Theory. I learned so many new ways to think about integers and numbers in general. After this course, I think my number sense is definitely better than when I started. Also, I had lots of fun doing it! Introduction to number theory. 1 Primality Testing and RSA. The first stage of key-generation for RSA involves finding two large primes p, q. Because of the size of numbers used, must find primes by trial and error. Modern primality tests utilize properties of primes eg: an-1 = 1 mod n where GCD(a,n)=1. all primes numbers 'n' will satisfy this equation. some composite numbers will also satisfy the equation, and are called pseudo-primes. Most modern tests guess at a prime number 'n', then take a large number (eg 100) of numbers 'a', and apply this test to each. If Introduction to Number Theory. So, the notation. xy.Â Introduction to Number Theory. If we just want to nd any two divisors, there may be many ways to do so. Weâ€™d like to be able to nd a list of divisors in such a way that the same list is always found. Instead of looking for any divisors, letâ€™s agree to nd all prime divisors of a number. Introduction to Number Theory. Example: 120 = 12 Â· 10 = 3 Â· 4 Â· 2 Â· 5 = 3 Â· 2 Â· 2 Â· 2 Â· 5. Or, 120 = 2 Â· 60 = 2 Â· 6 Â· 10 = 2 Â· 2 Â· 3 Â· 2 Â· 5. We get the same prime factors, even though we didnâ€™t start with the same initial pair of divisors. Introduction to Number Theory. In fact, this will always be true !! Theo... An Introduction to the Theory of Numbers is a classic textbook in the field of number theory, by G. H. Hardy and E. M. Wright. The book grew out of a series of lectures by Hardy and Wright and was first published in 1938. The third edition added an elementary proof of the prime number theorem, and the sixth edition added a chapter on elliptic curves. List of important publications in mathematics. Section5.2Introduction to Number Theory. Â¶ We have used the natural numbers to solve problems. This was the right set of numbers to work with in discrete mathematics because we always dealt with a whole number of things. The natural numbers have been a tool. Let's take a moment now to inspect that tool. What mathematical discoveries can we make about the natural numbers themselves? This is the main question of number theory: a huge, ancient, complex, and above all, beautiful branch of mathematics. Historically, number theory was known as the Queen of Mathematics and was very much a branch