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An introduction to number theory. (English)

Graduate Texts in Mathematics 232. London: Springer. x, 294 p. EUR 44.95/net; sFr. 82.00; £35.00; $ 59.95 (2005). [ISBN 1-85233-917-9/hbk]

The book under review contains several topics which are usually not brought together in an introductory text. The book is meant to give a broad introduction to advanced undergraduate students with no knowledge of number theory. Therefore, the authors hit many subjects but do not go too deep into details. Each chapter contains many exercises and historical notes. The authors require a modest background in complex analysis and elementary algebra. In my opinion, because so many topics are treated in an accessible way, the book is very well suited for an introductory course in number theory. The following topics are discussed: some elementary number theory (basic facts about primes, unique factorization theorem on **Z**); Diophantine equations (history on the equations of Fermat and Catalan); quadratic congruences and quadratic equations, unique prime ideal factorization in quadratic number fields; some basics of elliptic curves and applications to Diophantine problems such as the congruent number problem, the taxicab problem and elliptic divisibility sequences; elliptic functions; heights on elliptic curves and a proof of the Mordell Theorem in a special case; proof of the existence of the Neron-Tate height; some basics of the Riemann zeta function and a deduction of its functional equation; Dirichlet characters, L-functions, and a proof that each arithmetic progression contains infinitely many primes; connections between analytic and algebraic number theory, such as the Dirichlet class number formula, signs for Gauss sums, and the Birch-Swinnerton Dyer conjecture (a weak form is discussed); some elementary primality tests and factorization methods and a brief discussion on the RSA-public key cryptosystem.

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Keywords : Introduction to number theory; elliptic curves; heights; prime number theory; computational number theory

Classification :

∗11-01 Textbooks (number theory)
11A41 Elemementary prime number theory
11Dxx Diophantine equations
11G05 Elliptic curves over global fields
11M06 Riemannian zeta-function and Dirichlet L-function
11R11 Quadratic extensions
11Y05 Factorization
11Y11 Primality
11Y16 Algorithms

Cited in ...