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Titolo	Excursions in Multiplicative Number Theory // by Olivier Ramaré
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ISBN	9783030731694 9783030731687
Edizione	[1st ed. 2022.]
Descrizione fisica	1 online resource (342 pages)
Collana	Birkhäuser Advanced Texts Basler Lehrbücher, , 2296-4894
Disciplina	512.7
Soggetti	Number theory Number Theory
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Approach: Multiplicativity -- Arithmetic Convolution -- A Calculus on Arithmetical Functions -- Analytical Dirichlet Series -- Growth of Arithmetical Functions -- An "Algebraical" Multiplicative Function -- Möbius Inversions -- The Convolution Walk -- Handling a Smooth Factor -- The Convolution Method -- Euler Products and Euler Sums -- Some Practice -- The Hyperbola Principle -- The Levin-Fanleib Walk -- The Mertens Estimates -- The Levin-Fanleib Theorem -- Variations on a Theme of Chebyshev -- Primes in progressions -- A famous constant -- Euler Products with Primes in AP -- Chinese Remainder and Multiplicativity -- The Mellin Walk -- The Riemann zeta-function -- The Mellin Transform -- Proof Theorem -- Roughing up: Removing a Smoothing -- Proving the Prime Number Theorem -- Higher Ground: Applications / Extensions -- The Selberg Formula -- Rankin's Trick and Brun's Sieve -- Three Arithmetical Exponential Sums -- Convolution method / Möbius function -- The Large Sieve Inequality -- Montgomery's Sieve.
Sommario/riassunto	This textbook offers a unique exploration of analytic number theory that is focused on explicit and realistic numerical bounds. By giving precise proofs in simplified settings, the author strategically builds practical tools and insights for exploring the behavior of arithmetical functions. An active learning style is encouraged across nearly three hundred exercises, making this an indispensable resource for both

students and instructors. Designed to allow readers several different pathways to progress from basic notions to active areas of research, the book begins with a study of arithmetic functions and notions of arithmetical interest. From here, several guided “walks” invite readers to continue, offering explorations along three broad themes: the convolution method, the Levin–Fanleeb theorem, and the Mellin transform. Having followed any one of the walks, readers will arrive at “higher ground”, where they will find opportunities for extensions and applications, such as the Selberg formula, Exponential sums with arithmetical coefficients, and the Large Sieve Inequality. Methodology is emphasized throughout, with frequent opportunities to explore numerically using computer algebra packages Pari/GP and Sage. Excursions in Multiplicative Number Theory is ideal for graduate students and upper-level undergraduate students who are familiar with the fundamentals of analytic number theory. It will also appeal to researchers in mathematics and engineering interested in experimental techniques in this active area.

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