J.J.P. Veerman

Numbers from all Angles

Motivated by curiosity and a deep love for the subject, this self-contained number theory text is designed primarily for advanced undergraduates and graduate students. It assumes a level of mathematical maturity found among students in physics, engineering, and mathematics. Covering the content of a full-year number theory course, the book can serve either as a primary textbook or as a supplementary reference in advanced topics courses. With its comprehensive scope and depth, it also offers an efficient resource for anyone seeking to explore the central currents of number theory.

The exposition begins with elementary concepts and gradually advances to more sophisticated material. Proofs are presented in full detail, ensuring clarity and rigor. The selection of topics is broad, and over 150 illustrations provide visual insight, particularly where geometry enriches understanding. More than 400 exercises, ranging in difficulty, are included to reinforce mastery of the material.

The book is organized into three parts. Part I introduces topics typically encountered in an advanced undergraduate course in number theory, with the later sections of the part extending to graduate-level material. Part II presents the foundations of major branches of number theory, including algebraic, analytic, ergodic, and probabilistic approaches. Part III covers advanced results, featuring proofs of the prime number theorem, the Birkhoff ergodic theorem, and the unsolvability of the general quintic, among others. The author also discusses possible uses of the book in non-number theory courses and in fields outside mathematics. Nine appendices supplement the main text with related material that, while valuable, would otherwise disrupt the narrative flow.

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