An invitation to modern number theory /

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1974-),
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Monografía

In a manner accessible to beginning undergraduates, An Invitation to Modern Number Theory introduces many of the central problems, conjectures, results, and techniques of the field, such as the Riemann Hypothesis, Roth's Theorem, the Circle Method, and Random Matrix Theory. Showing how experiments are used to test conjectures and prove theorems, the book allows students to do original work on such problems, often using little more than calculus (though there are numerous remarks for those with deeper backgrounds). It shows students what number theory theorems are used for and what led to them and suggests problems for further research. Steven Miller and Ramin Takloo-Bighash introduce the problems and the computational skills required to numerically investigate them, providing background material (from probability to statistics to Fourier analysis) whenever necessary. They guide students through a variety of problems, ranging from basic number theory, cryptography, and Goldbach's Problem, to the algebraic structures of numbers and continued fractions, showing connections between these subjects and encouraging students to study them further. In addition, this is the first undergraduate book to explore Random Matrix Theory, which has recently become a powerful tool for predicting answers in number theory. Providing exercises, references to the background literature, and Web links to previous student research projects, An Invitation to Modern Number Theory can be used to teach a research seminar or a lecture class

Título: An invitation to modern number theory Steven J. Miller and Ramin Takloo-Bighash

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Descripción física: 1 online resource (526 pages)

Tipo Audiovisual: Benford's Law Cantor set Chebyshev's Theorem Cramér model Dirac delta functional Euclid's Theorem Fejér's Theorem Horner's algorithm Isoperimetric Inequality Liouville's Theorem Newton's Method Pigeon-Hole Principle Poisson Summation Quadratic Reciprocity Riemann zeta function Tauberian theorems Taylor series arithmetic mean axiom of choice divide and conquer eigenvalues golden mean order of approximation supremum symmetric property uncertainty principle unit point mass

Bibliografía: Includes bibliographical references and index

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AND APPROXIMATIONS -- Chapter 5. Algebraic and Transcendental Numbers -- Chapter 6. The Proof of Roth's Theorem -- Chapter 7. Introduction to Continued Fractions -- PART 3. PROBABILISTIC METHODS AND EQUIDISTRIBUTION -- Chapter 8. Introduction to Probability -- Chapter 9. Applications of Probability: Benford's Law and Hypothesis Testing -- Chapter 10. Distribution of Digits of Continued Fractions -- Chapter 11. Introduction to Fourier Analysis -- Chapter 12. {nk#} and Poissonian Behavior -- PART 4. THE CIRCLE METHOD -- Chapter 13. Introduction to the Circle Method -- Chapter 14. Circle Method: Heuristics for Germain Primes -- PART 5. RANDOM MATRIX THEORY AND L-FUNCTIONS -- Chapter 15. From Nuclear Physics to L-Functions -- Chapter 16. Random Matrix Theory: Eigenvalue Densities -- Chapter 17. Random Matrix Theory: Spacings between Adjacent Eigenvalues -- Chapter 18. The Explicit Formula and Density Conjectures -- Appendix A. Analysis Review -- Appendix B. Linear Algebra Review -- Appendix C. Hints and Remarks on the Exercises -- Appendix D. Concluding Remarks -- Bibliography -- Index

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