

Ribenboim, Paulo

The book of prime number records. (English) Zbl 0642.10001
New York etc.: Springer-Verlag, xxiii, 476 p. DM 98.00 (1988).

This most unusual book has two main sources of inspiration: prime numbers and the Guinness Book of Records. According to the author, one of his purposes in writing this book is the prevention of barroom disputes arising from differences in opinion concerning such topics as the largest known pair of twin primes. However, there is also another purpose to this book and that is to develop in undergraduates (and others) an interest in number theory. The author has set about this task by describing several aspects of the prime numbers and including relevant current records. For example, in his discussion of the infinitude of prime numbers, the notation $p^\#$ is introduced to denote the product of all primes less than or equal to p . It is then mentioned that $13649^\# + 1$ is the largest known prime of the form $p^\# + 1$. Since records tend by their very existence to be challenging, it is the author's (and the reviewer's) hope that this collection of records will serve to stimulate further research in number theory.

It would be a great mistake, however, to regard this book as a mere compendium of records. It is, as well, a most interesting discussion of a great many of the aspects, properties, and applications of prime numbers. Indeed, even a section on public-key cryptography is included. Some indication of the variety of information contained in this book is conveyed by the titles of its six chapters.

1. How many primes are there?
2. How to recognize whether a natural number is a prime?
3. Are there functions defining prime numbers?
4. How are the prime numbers distributed?
5. Which special kinds of primes have been considered?
6. Heuristic and probabilistic results about prime numbers.

The author has written this book in a manner that makes it easily accessible to any mathematically inclined undergraduate. His expository style is clear and his personal style charming. Also, because of the detail and variety of information included in this volume, even the specialist will benefit from reading it. Furthermore, about 100 pages of the text of this book are devoted to an extensive bibliography concerning prime numbers.

In spite of being identified on p. 123 as a numerologist, the reviewer warmly recommends this most informative and entertaining book to anyone who claims an interest in number theory.

Reviewer: [H.C. Williams](#)

MSC:

- [11-01](#) Introductory exposition (textbooks, tutorial papers, etc.) pertaining to number theory
- [11-02](#) Research exposition (monographs, survey articles) pertaining to number theory
- [11A41](#) Primes
- [11N05](#) Distribution of primes
- [11B39](#) Fibonacci and Lucas numbers and polynomials and generalizations
- [11N13](#) Primes in congruence classes
- [11M06](#) $\zeta(s)$ and $L(s, \chi)$

Cited in **8** Reviews
Cited in **72** Documents

Keywords:

Fermat numbers; Wieferich numbers; Mersenne numbers; pseudoprimes; Carmichael numbers; prime counting function; arithmetic progressions; Goldbach conjecture; zeros of Riemann zeta-function; differences between consecutive primes; Möbius function; twin primes; current records; prime numbers; applications; public-key cryptography; bibliography