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THE FIRST RESOURCE FOR MATHEMATICS

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The little book of numbers. (English) Zbl 08107832

Cham: Birkhäuser (ISBN 978-3-032-04862-2/pbk; 978-3-032-04863-9/ebook). xi, 195 p. (2025).

Explaining the origin and evolution of mathematics for the non-mathematician is a story that has been told in several books already. That often involves easy-to-understand concepts such as numbers, in particular prime numbers and related problems, some of which are still unsolved.

In this book, the author sketches the evolution of mathematics from counting and recording numbers in antiquity to the use of set theory that forms the foundation of present mathematics. He uses some particular numbers as stepping stones to tell the history: from zero and one to $\sqrt{2}$, φ (golden ratio), π, e (Euler's number), $i = \sqrt{-1}$, 10, prime numbers (including some related conjectures), large numbers (Graham's number, Knuth's arrow-up notation), to arrive at ∞ (transfinite numbers, cardinals and ordinals). It is explained why the extension of the number system became necessary to solve certain problems and how some particular number is associated with some major step in the evolution of mathematics.

The book ends with an historical overview of different philosophical visions on the ontology and epistemology of mathematics which start from the question: 'What is a number really?' which propagates into the eternal dispute: 'Is mathematics invented or discovered?'

The relatively short chapters are written in a narrative style with few formulas. The last chapters about large and transfinite numbers and the concluding philosophical history are a bit longer and require more focus of the reader.

Reviewer: Adhemar Bultheel (Leuven)

MSC:

00A09 Popularization of mathematics
00A30 Philosophy of mathematics
01A05 General histories, source books
03A05 Philosophical and critical aspects of logic and foundations
03E10 Ordinal and cardinal numbers

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