Notes on Number Theory and Discrete Mathematics
Vol. 18, 2012, No. 3, 48

The Irrationals: A Story of the Numbers You Can't Count On

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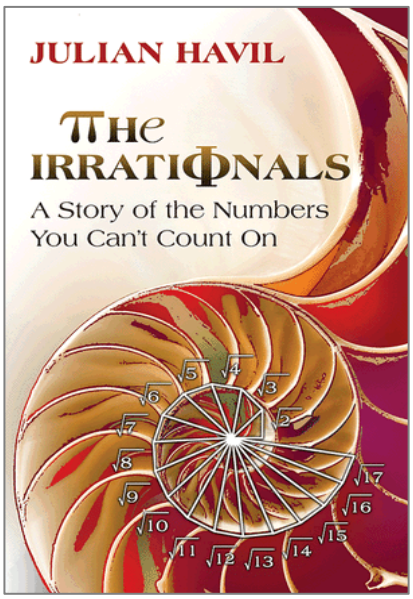
Julian Havil. 2012.
The Irrationals: A Story of the Numbers You Can't Count On.
Princeton & Oxford: Princeton University Press; 320 pp.
Cloth ISBN: 9780691143422; eBook ISBN: 9781400841707.



This is a well-written book to which senior high school students who do not intend to study mathematics at university should be exposed in their last two years at school.

The ideas are challenging and provocative, with numerous clear diagrams. The topics are presented with numerous examples, and unobtrusive humour which renders the exposition even more palatable.

The book would be an ideal source of ideas in a mathematics course within a liberal arts college because it links not only with the historical source of mathematics problems, but also with some of the great ideas of philosophy.

After noting that every rational number is equidistant from two other rational numbers, the author defines irrationals as “the set of all real numbers having different distances from all rational numbers”. And that they are numbers which cannot be expressed as a ratio of two integers, or that have decimal expansions that are neither infinite nor recurring.

Havil engages our attention with distinctions, such as that between "ordinary" irrational numbers and transcendentals, and with questions such as whether the decimal expansion of irrationals is "random". These are framed in such a way that they appeal to anyone who is fascinated by the “infinite” and the puzzles which arise in considering what is meant by these commonly used (and mis-used) terms.

The author, a retired former master at Winchester College, England, is in command of the topics which he expounds so clearly. Of interest to readers will be the other books which he has also published with Princeton:

- *Gamma: Exploring Euler's Constant,*
- *Nonplussed!: Mathematical Proof of Implausible Ideas,* and
- *Impossible?: Surprising Solutions to Counterintuitive Conundrums.*