

For particularly brilliant theoretical physicists such as James Clerk Maxwell, Paul Dirac, and Albert Einstein, the search for mathematical truths led to strange new understandings of the ultimate nature of reality. But what are these truths? What are the mysterious numbers that explain the universe?

In *Fantastic Numbers and Where to Find Them*, the leading theoretical physicist and YouTube star Antonio Padilla takes us on an irreverent cosmic tour of nine of the most extraordinary numbers in physics, offering a startling picture of how the universe works. They include Graham's number, which is so large that if you thought about it in the wrong way, your head would collapse into a singularity; TREE(3), whose finite nature can never be definitively proved because to do so would take so much time that the universe would experience a Poincaré recurrence, resetting to precisely the state it currently holds, down to the arrangement of individual atoms; and 10⁻¹²⁰, measuring the desperately unlikely balance of energy needed to allow the universe to exist for more than just a moment, to extend beyond the size of a single atom.

Leading us down the rabbit hole to a deeper knowledge of reality, Padilla explains how these unusual numbers are the keys to grasping such mind-boggling phenomena as black holes, relativity, and the problem of the cosmological constant—that the two best and most rigorously tested ways of understanding the universe contradict each other. *Fantastic Numbers and Where to Find Them* is a combination of popular and cutting-edge science—and a lively, entertaining, and even funny exploration of the most fundamental units of the universe.

ANTONIO PADILLA is a leading theoretical physicist and cosmologist at the University of Nottingham. In 2016, he and his team shared the Buchalter Cosmology Prize for their work on the cosmological constant. He is also a star of the Numberphile YouTube network, where his most popular videos include a discussion of Ramanujan's sum of all positive integers, which has been viewed more than eight million times.

READ BY THE AUTHOR



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