The Millennium Problems: The Seven Greatest Unsolved Mathematical Puzzles of Our Time

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The Millennium Problems: The Seven Greatest Unsolved Mathematical Puzzles of Our Time

By Christine Guenther <guenther@pop.pacificu.edu>

In May 2000 in Paris, the Clay Mathematics Institute announced an award of one million dollars for the solution to each of seven great problems in mathematics. These historic problems range from solving the elusive fluid flow equations that were posited over 150 years ago, to proving the famous Riemann Hypothesis, to the modern quest of determining if computers can efficiently solve a certain class of problems. Their solutions would encompass a breakthrough in quantum field theory, a pattern of the distribution of prime numbers, a transformation of encryption techniques, a classification of three-dimensional shapes, and an accurate model of water circulation in oceans and rivers.

Keith Devlin has been an excellent popularizer of mathematics, with twenty-three books including the “The Math Gene” and “The Language of Mathematics: Making the Invisible Visible”, and is a weekend commentator on National Public Radio. His books are characterized by humor, clarity, and interesting and accessible mathematics. Common themes are creativity and aesthetics in mathematics. “The Millennium Problems” is his exposition of the seven million-dollar problems.

In his lucid, entertaining style, Keith Devlin brings the problems and their excitement to a lay audience by developing the mathematical background necessary to understand them, their historical context, and their importance. It is a challenging task given the range of topics; even experts in different fields of mathematics find it difficult to follow each other’s work. He does not give a precise statement of most of the problems. Instead, he presents biographies of the mathematicians who first investigated them, how they arose, and the subsequent development of the ideas. (The biographies are especially apropos given the current media spate of one-sided mathematicians; one finds lawyers, philosophers, intellectuals, diplomats, and musicians.)
A feature that makes this book so much fun to read is the mathematical gems that the author places throughout the text. For example, when he considers the problem that would put a physical theory of the nature of the universe on solid mathematical footing, he talks about the predilection that scientists historically have had for a mathematical description of the universe, and includes Johannes Kepler’s idea that the orbits of planets are nested in the Pythagoreans’ five regular geometric solids; when writing about a problem that uses complex numbers, the author explains how mathematicians have made sense of; he describes the philosophical debate over the roles of logic and intuition in the creation of mathematics, and presents Kurt Goedel’s discovery that it is impossible to have a complete axiomatic formulation of mathematics.

This is an ideal book for a reader with a strong interest in mathematics. He or she will gain an overview of current problems, and will enjoy exploring the many other engaging topics. It is accessible to general audiences as well, since it allows them to grasp the material without having to follow all of the details. By the nature of the seven problems, all readers will find material that is too difficult to understand completely from the presentation in this book. They will, however, discover through this exposition that mathematics is an alive, developing field, and can experience its excitement and beauty.

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6 THOUGHTS ON “THE MILLENNIUM PROBLEMS: THE SEVEN GREATEST UNSOLVED MATHEMATICAL PUZZLES OF OUR TIME”

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I am completely new to operating a blog however I do write in my journal on a daily basis. I’d like to start a blog so I will be able to share my experience and views online. Please let me know if you have any kind of suggestions or tips for brand new aspiring bloggers. Appreciate it!

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It
This book is an attempt to explain, at least where at all possible, the seven mathematical millennium problems, which the Clay Foundation in 2000 offered a one million dollar prize for the solving of each problem.