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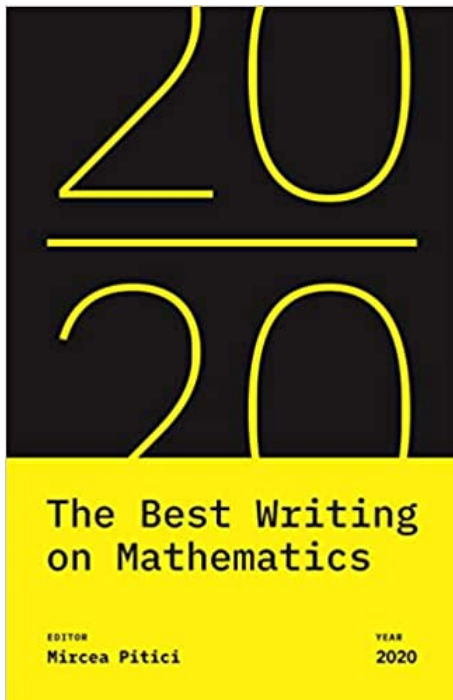
Book Reviews bring interesting mathematical sciences and education publications drawn from across the entire spectrum of mathematics to the attention of the CMS readership. Comments, suggestions, and submissions are welcome.

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The Best Writing on Mathematics, 2020

Edited by Mircea Pitici
Princeton University Press, 2020
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This is the eleventh volume in a remarkable series of annual anthologies. Earlier in this space I addressed some general features shared by all volumes. I will not repeat these remarks here; the interested reader will find it in the September 2019, issue. Instead, I will quote from the overview of this volume and add the titles of the individual articles.

"In a piece eerily reminding us of the current coronavirus health crisis, Steven Strogatz recounts the little-known contribution of differential equations to virology during the HIV crisis and makes the case for considering calculus among the heroes of modern life. [*Outsmarting a Virus with Math*].

"Peter Denning and Ted Lewis examine the genealogy, the progress, and the limitations of complexity theory—a set of principles developed by mathematicians and physicists who attempt to tame the uncertainty of social and natural processes. [*Uncertainty*].

"In yet another example of fusion between ideas from mathematics and physics, Bruce Boghosian describes how a series of simulations carried out to model the long-term outcome of economic interactions based on free-market exchanges inexorably leads to extreme inequality and to the oligarchical concentration of wealth. [*The Inescapable Casino*].

"Stan Wagon points out the harmonic-average intricacies, the practical paradoxes, and the policy implications that result from using the miles-per-gallon measure for the fuel economy of hybrid cars. [*Resolving the Fuel Economy Singularity*].

"Jørgen Veisdal details some of the comparative reasoning supposed to take place in majoritarian democracies—resulting in electoral strategies that lead candidates toward the center of the political spectrum. [*The Median Voter Theorem: Why Politicians Move to the Center*].

"In an autobiographical piece, John Baez narrates the convoluted professional path that took him, over many years, closer and closer to algebraic geometry—a branch of mathematics that offers insights into the relationship between the classical mechanics and quantum physics. [*The Math That Takes Newton into the Quantum World*].

"Erica Klarreich explains how Hao Huang used the combinatorics of cube nodes to give a succinct proof to a long-standing computer science conjecture that remained open for several decades, despite many repeated attempts to settle it. [*Decades-Old Computer Science Conjecture Solved in Two Pages*].

"A graph-based explanation, combined with a stereographic projection, also helped Richard Montgomery solve one of the questions posed by the dynamical system formed by three masses moving under the reciprocal influences of their gravitational pulls, also known as the three- body problem. [*The Three-Body Problem*].

"Chris King, who created valuable online resources freely available to everyone, describes the algebraic iterations that lead to families of fractal-like, visually stunning geometric configurations and stand at the confluence of multiple research areas in mathematics. [*The Intrigues and Delights of Kleinian and Quasi-Fuchsian Limit Sets*].

"In the next contribution to our volume, Jim Henle presents several paper-and-pencil games selected from the vast collection invented by Sid Sackson. [*Mathematical Treasures from Sid Sackson*].

"Dave Linkletter breaks the classic Rubik's cube apart and, using the mechanics of the cube's skeleton, counts for us the total number of possible configurations; then he reviews a collection of mathematical questions posed by the toy—some answered and some still open. [*The Amazing Math Inside the Rubik's Cube*].

"Colin Adams introduces with examples, defines, and discusses several important properties of the hyperbolic 3-manifold, a geometric notion both common to our physical environment and difficult to understand in its full generality. [*What Is a Hyperbolic 3-Manifold?*]

"In a similar geometric vein, with yet more examples, physical models, and definitions, followed by applications, Boris Odehnal presents an overview of higher dimensional geometries. [*Higher Dimensional Geometries: What Are They Good For?*].

"With linguistic flourishes recalling Fermat's cryptic style, James Propp traces the history of two apparently disconnected results in the theory of numbers—which, surprisingly, turned out to be strongly related—and tells us how an amateur mathematician used the parallelism to prove one of them. [*Who Mourns the Tenth Heegner Number?*].

"Patrick Honner works out in several different ways a simple multiplication example to compare the computational efforts required by the algorithms used in each case and to illustrate the significant benefits that result when the most efficient method is scaled up to multiply big numbers. [*On Your Mark, Get Set, Multiply*].

"Ben Orlin combines his drawing and teaching talents to prove that ignorance of widely known mathematics can be both hilariously ridiculous and academically rewarding! [*1994, The Year Calculus Was Born*].

"Donald Teets's piece is entirely concerned with the young Karl Friedrich Gauss's contribution to the history of the Christian calendar. [*Gauss's Computation of the Easter Date*].

"Paul Thagard proposes five conjectures (and many more puzzling questions) on the working of mathematics in mind and society and formulates an eclectic metaphysics that affirms both realistic and fictional qualities for mathematics. [*Mathematical Knowledge and Reality*].

"Mark Colyvan asserts that explanation in mathematics—unlike explanation in sciences and in general—is neither causal nor deductive; instead, depending on the context, mathematical explanation provides either local insights that connect similar mathematical situations or global answers that arise from non-mathematical phenomena. [*The Ins and Outs of Mathematical Explanation*].

"Gerry Hahn, Necip Doganaksoy, and Bill Meeker call (as they have done over a long period of time) for improving statistical inquiry and analysis by using new tools—such as tolerance and prediction intervals, as well as a refined analysis of the role of sample size in experiments. [*Statistical Intervals, Not Statistical Significance*]."

This volume ends, as usual, with a book list of other recently published notable writings. The next volume, The Best Writing on Mathematics, 2021, is due to appear in the Spring of 2022.