Algorithms from THE BOOK
by Kenneth Lange

Martin Aigner and Günter Ziegler’s celebrated Proofs from THE BOOK assembled dozens of proofs in the style of Paul Erdős, who often spoke of THE BOOK, in which the supreme being collected the most elegant and marvelous proofs of mathematical results. Lange’s Algorithms from THE BOOK is intentionally written as an algorithms-based analogue of Aigner and Ziegler’s classic. “My more humble purpose,” Lange writes, “is to highlight some of the most famous and successful algorithms and the lovely mathematics behind them.” Most of these algorithms are provided with historical context and code written in Julia, a relatively new (2012) high-level programming language that is well-suited to numerical computation. The skilled reader should have no trouble translating Lange’s code into their favorite language or preferred software system.

The book begins with an assortment of old favorites, such as the Euclidean algorithm and ancient techniques for multiplication of large integers. Other chapters focus on sorting, graph theory, primality testing, numerical linear algebra, linear programming, Newton’s method, the Fast Fourier transform, and Monte Carlo methods. Lange, a computational geneticist and statistician, understandably favors practical algorithms over theoretical computer science. For example, the AKS deterministic primality-testing algorithm is eschewed in favor of much faster probabilistic procedures.

Algorithms from THE BOOK is divided into twelve chapters, each of which is split into approximately six to eight subsections. Each chapter ends with a collection of problems associated to the topic. A generous appendix reviews some important mathematical ingredients that arise frequently in the discussion of the algorithms. For example, compactness and convexity, Lagrange multipliers, and elementary number theory are covered.

Overall, Algorithms from THE BOOK provides a modern twist to Erdős’ concept of “THE BOOK.” It is suitable for any upper-level mathematics major, mathematician, or computer scientist interested in algorithms or numerical computation.

The Wonder Book of Geometry: A Mathematical Story
by David Acheson

The Wonder Book of Geometry takes the reader on a leisurely tour of classical geometry, starting with Thales’ measurement of the Great Pyramid and Eratosthenes’ estimate of the Earth’s radius. Acheson proceeds to old favorites like the Pythagorean theorem, congruent triangles, and conic sections, along with less-familiar topics such as Ceva’s theorem, the Gergonne point, and Heron’s formula. The tour ends with an excursion into non-Euclidean geometries and an invitation to topology. Throughout, the author provides historical remarks and images from historical textbooks throughout the ages.

The book is an easy read for the mathematically literate. It features generous line spacing and over 130 black-and-white photographs, along with even more line drawings. Acheson makes no assumptions about the mathematical background of the reader. “[W]ith geometry, it is possible to see something of the whole nature and spirit of mathematics at its best, at almost any age, within just half an hour of starting,” he explains. Perhaps The Wonder Book of Geometry might best serve the layperson who never fully appreciated the beauty of axiomatic thought. Similarly, high school or college students who have forgotten much of classical geometry (or never understood the point of it) might benefit from a friendly re-exposure to the subject.