

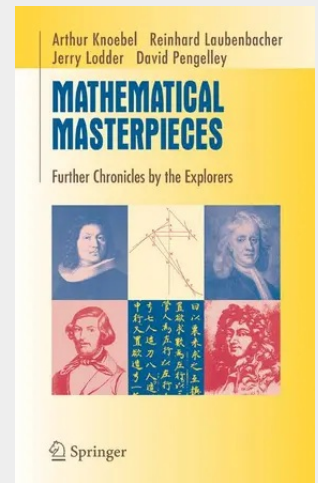
Mathematical Masterpieces

Further Chronicles by the Explorers

This book traces the historical development of four different mathematical concepts by presenting readers with the original sources, yielding the rewards of a deeper understanding of the subject, an appreciation of the details, and a glimpse into the direction research has taken. Each chapter showcases a masterpiece of mathematical achievement, anchored around a sequence of selected primary sources. The authors begin by studying the interplay between the discrete and continuous, with a focus on sums of powers. They proceed to the development of algorithms for finding numerical solutions of equations as developed by Newton, Simpson and Smale. Next they explore our modern understanding of curvature, with its roots in the emerging calculus of the 17th century, while the final chapter ends with an exploration of the elusive properties of prime numbers, and the patterns found therein. The book includes exercises, numerous historical photographs, and an annotated bibliography.

In introducing his essays on the study and understanding of nature and evolution, biologist Stephen J. Gould writes: [W]e acquire a surprising source of rich and apparently limitless novelty from the primary documents of great thinkers throughout our history. But why should any nuggets, or even ?akes, be left for intellectual miners in such terrain? Hasn't the Origin of Species been read untold millions of times? Hasn't every paragraph been subjected to overt scholarly scrutiny and exegesis?

Let meshareasecretrooted ingeneral human foibles. . . . Very few people, including authors willing to commit to paper, ever really read primary sources—certainly not in necessary depth and completion, and often not at all. . . . I can attest that all major documents of science remain chock-full of distinctive and illuminating novelty, if only people will study them in full and in the original editions. Why would anyone not yearn to read these works; not hunger for the opportunity? [99, p. 6f] It is in the spirit of Gould's insights on an approach to science based on primary texts that we offer the present book of annotated mathematical sources, from which our undergraduate students have been learning for more than a decade. Although teaching and learning with primary historical sources require a commitment of study, the investment yields the rewards of a deeper understanding of the subject, an appreciation of its details, and a glimpse into the direction research has taken. Our students read sequences of primary sources.



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