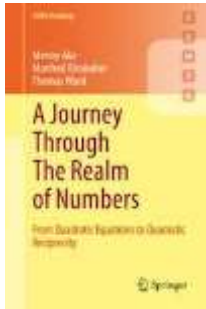




# A Journey Through The Realm of Numbers



**Menny Aka, Manfred Einsiedler, and Thomas Ward**

<b>Publisher:</b>	Springer
<b>Publication Date:</b>	2020
<b>Number of Pages:</b>	364
<b>Format:</b>	Paperback
<b>Series:</b>	Springer Undergraduate Mathematics Series
<b>Price:</b>	\$44.99
<b>ISBN:</b>	978-3-030-55232-9
<b>Category:</b>	Textbook

## MAA REVIEW

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[Reviewed by Mckenzie West, on 08/8/2021]

*A Journey Through the Realm of Numbers* is an introductory number theory textbook born of notes used to teach enthusiastic high school students. The authors work to inspire the reader's curiosity in both the narrative and the exercises. The first two chapters of the book build the mathematical foundation of proof writing, sets and mappings, and roots of polynomial equations. Then, motivated by the study of roots of polynomial equations, the remaining 6 chapters walk through the story of sums of squares, Euclidean rings, the Chinese Remainder theorem, Diophantine equations, the multiplicative group modulo a prime, and quadratic reciprocity.

One example topic is section 4.3, which is entirely devoted to the thorough deconstruction of Zagier's one-sentence proof of the fact that every prime that is one more than a multiple of four can be written as the sum of two squares. This deconstruction includes explanations, just-in-time definitions, and a variety of pictures with colorful descriptions to help the student understand Zagier's intuition.

There are exercises interspersed in the text and comprise sections at the end of each chapter. Many of the end-of-chapter exercises have a scaffold structure, introducing new topics as they go. A little over half of the exercises have hints in the back of the book. The book also has an introduction to Sage, a computer algebra software, and every chapter ends with a couple of computational exercises. There are 25 "Outlooks" throughout the text, which are 1-2 paragraph-long notes describing related advanced mathematics topics.

I would recommend this book as a textbook for a special topics or elective number theory course. By selectively using the various chapters of the book, *A Journey Through the Realm of Numbers* would be appropriate for any level of mathematics major.

Mckenzie West is an assistant professor at the University of Wisconsin - Eau Claire. Her mathematical research is in the field of computational number theory and arithmetic geometry.

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