



# Reading, Writing, and Proving (Undergraduate Texts in Mathematics)

By Ulrich Daepp

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**Reading, Writing, and Proving (Undergraduate Texts in Mathematics)** By Ulrich Daepp

This book, which is based on Pólya's method of problem solving, aids students in their transition from calculus (or precalculus) to higher-level mathematics. The book begins by providing a great deal of guidance on how to approach definitions, examples, and theorems in mathematics and ends with suggested projects for independent study. Students will follow Pólya's four step approach: analyzing the problem, devising a plan to solve the problem, carrying out that plan, and then determining the implication of the result. In addition to the Pólya approach to proofs, this book places special emphasis on reading proofs carefully and writing them well. The authors have included a wide variety of problems, examples, illustrations and exercises, some with hints and solutions, designed specifically to improve the student's ability to read and write proofs. Historical connections are made throughout the text, and students are encouraged to use the rather extensive bibliography to begin making connections of their own. While standard texts in this area prepare students for future courses in algebra, this book also includes chapters on sequences, convergence, and metric spaces for those wanting to bridge the gap between the standard course in calculus and one in analysis.

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### Editorial Review

#### Review

From the reviews of the second edition:

“The book is written in an informal way, which could please the beginners and not offend the more experienced reader. A reader can find a lot of problems for independent study as well as a lot of illustrations encouraging him/her to draw pictures as an important part of the process of mathematical thinking.”

?European Mathematical Society, September 2011

“Several areas like sets, functions, sequences and convergence are dealt with and several exercises and projects are provided for deepening the understanding. ... It is the impression of the author of this review that the book can be particularly strongly recommended for teacher students to enable them to catch and transfer the “essence” of mathematical thinking to their pupils. But also everybody else interested in mathematics will enjoy this very well written book.

?Burkhard Alpers (Aalen), **zbMATH**

“The book is primarily concerned with an exposition of those parts of mathematics in which students need a more thorough grounding before they can work successfully in upper-division undergraduate courses. ... a mathematically-conventional but pedagogically-innovative take on transition courses.”

?Allen Stenger, **The Mathematical Association of America**, September, 2011

#### From the Back Cover

*Reading, Writing, and Proving* is designed to guide mathematics students during their transition from algorithm-based courses such as calculus, to theorem and proof-based courses. This text not only introduces the various proof techniques and other foundational principles of higher mathematics in great detail, but also assists and inspires students to develop the necessary abilities to read, write, and prove using mathematical definitions, examples, and theorems that are required for success in navigating advanced mathematics courses.

In addition to an introduction to mathematical logic, set theory, and the various methods of proof, this textbook prepares students for future courses by providing a strong foundation in the fields of number theory, abstract algebra, and analysis. Also included are a wide variety of examples and exercises as well as a rich selection of unique projects that provide students with an opportunity to investigate a topic independently or as part of a collaborative effort.

New features of the Second Edition include the addition of formal statements of definitions at the end of each chapter; a new chapter featuring the Cantor–Schröder–Bernstein theorem with a spotlight on the

continuum hypothesis; over 200 new problems; two new student projects; and more. An electronic solutions manual to selected problems is available online.

From the reviews of the First Edition:

“The book...emphasizes Pólya’s four-part framework for problem solving (from his book *How to Solve It*)...[it] contains more than enough material for a one-semester course, and is designed to give the instructor wide leeway in choosing topics to emphasize...This book has a rich selection of problems for the student to ponder, in addition to “exercises” that come with hints or complete solutions...I was charmed by this book and found it quite enticing.”

– Marcia G. Fung for *MAA Reviews*

“... A book worthy of serious consideration for courses whose goal is to prepare students for upper-division mathematics courses. Summing Up: Highly recommended.”

– J. R. Burke, Gonzaga University for *CHOICE Reviews*

#### About the Author

Ueli Daepp is an associate professor of mathematics at Bucknell University in Lewisburg, PA. He was born and educated in Bern, Switzerland and completed his PhD at Michigan State University. His primary field of research is algebraic geometry and commutative algebra.

Pamela Gorkin is a professor of mathematics at Bucknell University in Lewisburg, PA. She also received her PhD from Michigan State where she worked under the director of Sheldon Axler. Prof. Gorkin’s research focuses on functional analysis and operator theory.

Ulrich Daepp and Pamela Gorkin co-authored of the first edition of “Reading, Writing, and Proving” whose first edition published in 2003. To date the first edition (978-0-387-00834-9 ) has sold over 3000 copies.

## Users Review

**From reader reviews:**

**Nora Carter:**

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