

Mathematics for Young Mathematicians

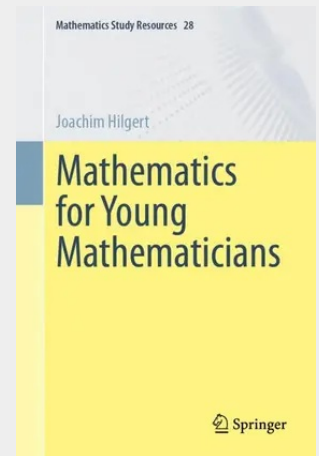
This book is a guide for self-study of mathematics as a scientific discipline. It addresses a diverse audience: young people interested in gaining a deeper understanding of the material presented in school, teachers who run math clubs and are looking for material that connects to the school curriculum, university members curious about an alternative perspective on mathematics as a field of study, professionals from other disciplines who have a basic mathematical background and wish to deepen their understanding of mathematics.

This book assumes an intuitive grasp of natural numbers and solid mastery of the calculation techniques taught in lower secondary school. Starting from elementary problems in enumerative combinatorics, it first offers a systematic description of the natural numbers. Considerations on solving equations then lead, step by step, to the introduction of real numbers. This enables the development of powerful concepts for modeling distances and other quantities such as areas and volumes. The study of systems of equations further introduces the concepts of "vector space" and "linearization," which allow computations through linear approximation.

In this way, this book conveys the fundamental content of the first three to four semesters of a mathematics degree program. It deliberately avoids the usual division into separate subjects such as "Linear Algebra," "Analysis," or "Probability." Instead, the problems arise from questions about mathematical modeling or from interesting mathematical ideas.

This book is a translation of the original German edition, enriched with exercises and solutions. The translation was done with the help of an artificial intelligence machine translation tool. A subsequent human revision was done primarily in terms of content, so that this book may read stylistically differently from a conventional translation.

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