

## Preface to the English Translation

The book in your hands is based on the German text “Alles Mathematik”. It consists of the written versions of popular mathematical lectures given to a large and diverse audience at a renowned lecture hall in Berlin. How the book came into being, and what the intentions and the scope are, can be read in the Prefaces to the German Editions. We thank Ulrike Schmickler-Hirzebruch who initiated the project and the principal translator Philip Spain. It is our hope that readers will enjoy browsing through the book, picking up in a leisurely way some of the most important developments and challenges of mathematics today.



# Prefaces to the German Editions

## Preface to the first German Edition

A glance at the Spring 1990 program at Urania suffices to establish that this Berlin educational institution, with its rich tradition, has provided an astonishing variety of topics: prehistory and current politics, the humanities and physical sciences, slide shows on the Hindu Kush and medical precautionary advice—all areas were covered. All but one: there was not a single one on mathematics. When we spoke with the Director of Urania in May 1990 we wanted to change this and aimed at dispelling the prevalent prejudices: too hard, too dry, too abstract, too detached. Whether we succeeded is for those who have attended the more than 50 Urania lectures on mathematics to decide, and naturally for the reader of the selection that we have assembled here.

Two simple basic principles have guided us in organizing this volume. First: mathematics is, quite simply, everywhere, for in many cases it is (often the only) tool for analyzing and understanding the problems. From the CD player to the stock exchange, from computer tomography to transport planning—it is all (also) mathematics. Second, mathematics, unlike any other science, is both sides of the same coin: at once the purest science—thought as art—and on the other hand the most applicable and useful. This sounds quite different from the attributes mentioned above: abstract and detached. But would you have thought that the mysterious prime numbers, which have engaged mathematicians since antiquity, today contribute essentially to our data security?

These two aspects correspond to the parts *Case Studies* and *Current Topics*. Third, we of course wanted to include several “hot” themes and up-to-date developments such as the solution of the Fermat Problem and the derivatives formula which won a Nobel Prize. In addition you will find a prologue written by a science journalist and an epilogue by a mathematician-philosopher.

Our heartfelt thanks are extended to all the authors for their readiness to fashion a spoken lecture into written form, a task notoriously harder than one believes at the start. We also thank Ulrike Schmickler-Hirzebruch of Vieweg Verlag for her interest in, and support for, the project, and above all Christoph Eyrich for the professional technical design of the book. The lectures, and now the compiled book, have brought us much pleasure—and we wish the same to our readers.

Berlin, July 2000

*Martin Aigner · Ehrhard Behrends*

### Preface to the second German Edition

The first edition of this book was very well received and prompted a large number of comments and suggestions. For the present edition we have thoroughly revised the text and also included three new contributions on current topics: intelligent materials, discrete tomography, and game theory.

We are certain that these chapters present interesting matters, well worth knowing, maybe surprising. We hope that our panorama of classical and current topics will again convince the reader that (almost) all is mathematics.

Berlin, July 2002

*Martin Aigner · Ehrhard Behrens*

### Preface to the third German Edition

This third edition of “Alles Mathematik” appeared for the *Jahr der Mathematik 2008*. Since the appearance of the second edition there have been many more interesting mathematics lectures at Urania, and we have chosen several to broaden our spectrum. You can now learn about climate modeling (R. Klein), the Poincaré Conjecture (K. Ecker), the mathematics of reflections (J. Richter-Gebert), and about Chance (E. Behrens); and Gero von Randow has chipped in a new prologue. We have also taken the opportunity to let the authors of the earlier articles bring them up to date.

We wish our readers many exciting hours in discovering the varied facets of mathematics.

Berlin, August 2008

*Martin Aigner · Ehrhard Behrens*