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# Introduction

The story of this book begins on 25 January 2002, when the German Mathematical Society decided to hold a dinner to bring together the society's officers and a group of journalists. The agenda was a conversation about the image of mathematics in the world at large. One of the participants was Dr. Norbert Lossau, science editor for the newspaper *Die Welt*, with whom I met again several months later. Out of these conversations arose the idea of a regular column on mathematics.



I put together an extensive proposal, in which about 150 possible topics were sketched. My suggestion of “Five-Minute Mathematics” as the title of the column was accepted, the graphic designers came up with a logo, and the first column appeared in the Monday, 12 May 2003, edition of *Die Welt*. And so it went week after week, with the rhythm being broken only when Monday was a holiday and the newspaper did not appear. After two years and one hundred columns, “Five-Minute Mathematics” yielded to another column.

In my selection of topics I have attempted to think particularly of readers who left school long ago and perhaps have no concrete memory traces of the subject yet would like to learn something about mathematics. Should the quadratic formula and curve sketching be

the limit of what is worth learning about mathematics? Where is mathematics to be found in the “real world”?

In two years I was able to cover a wide spectrum of topics, as can be seen from a perusal of the table of contents. There is the contemporary and there is the classical; there are hors d’oeuvres and main courses. And in many places the reader will learn how mathematics penetrates our lives, whether in the lottery, cryptography, computer-aided tomography (CAT), and the evaluation of securities options.

Even before the final column appeared, I received a proposal from the publisher Vieweg to collect the columns in a book. There were many good reasons to begin at once. First, many regular readers of the column had inquired about such a book. Second, a newspaper column is confined to a fixed size, so that every column had to have the same length, regardless of the topic.<sup>1</sup> For some of the topics, the space limitation meant that important information had to be omitted, leaving the author with a guilty conscience. Therefore I am pleased that the book format allows such limitations to be overcome. And finally, the luxury of space in a book means that the word can be supplemented by the image: photographs, drawings, graphs, tables. . . .

In writing the column there were three aspects that I considered important:

*Mathematics is useful:* It should be made clear why our technologically based world could not function without mathematics. A label reading “mathematics inside” could be placed on many a product.

*Mathematics is fascinating:* Aside from its utility, mathematics offers a very special intellectual appeal. The irrepressible compulsion to see the solution of a problem through to the end can release enormous amounts of energy.

*Without mathematics one cannot understand the world:* According to Galileo, “The book of nature is written in the language of mathematics.” At his time, that was no more than a vision. Today it is known that mathematics is the bridge that leads us across the

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<sup>1</sup>At least that is what the author was told. Every now and then, the exigencies of the page layout required that the column be trimmed a bit.

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unknown into realms that lie beyond the limits of human perception. Without mathematics, it would be impossible, in Goethe's words, "to know what holds the world together from the inside."

I would like to thank Dr. Lossau for allowing me for two years to present mathematical topics to readers of *Die Welt*. I retain wonderful memories of our collaboration.

I wish also to thank Elke Behrends for many photographs, particularly the photomontages appearing in Chapters 6, 10, and 15. I am also grateful to colleagues Vagn Hansen (Copenhagen) and Robin Wilson (Oxford) for the images that they provided (Chapters 53 and 89). Finally, I would like to thank Tina Scherer and Albrecht Weis for their extirpation of so many typographical errors during proofreading so that you, dear reader, will not have to be annoyed by them.