"Wahrlich es ist nicht das Wissen, sondern das Lernen,
nicht das Besitzen, sondern das Erwerben,
nicht das Da-Seyn, sondern das Hinkommen,
was den grössten Genuss gewährt"

"It is not knowing, rather learning,
not possessing, rather obtaining,
not being present, rather reaching there,
which serves the greatest joy."

— Carl Friedrich Gauss

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Foreword

The extent and applications of mathematics are enormous, but a fair share of it is founded on a manageable amount of principles: I wish to present these in this book. I have chosen to call a principle in summarized form a *rule*. You will find the rules in blue text boxes, usually followed by an example of its usage. One of the main targets of this book is presenting the logical justification for the rules. In Chapter 1 - 5 you will find explanations[1] preceding every rule, while in chapter 6 some explanations are found directly after stating the rules (and eventual examples). As of chapter 7, some explanations are found in a concluding section named *Explanations*. This indicates that they are rather intricate or are so intuitively true that many will find the explanation superfluous.

The structure of the book
The book consists of a *Part I* and a *Part II*. *Part I* focuses on the basic understanding of the numbers and operations of calculation. *Part II* introduces the concept of algebra and the closely related topics of powers, equations, and functions. In addition, both *Part I* and *Part II* end with a chapter on geometry.

Notice! You will not find practice problems and applications of mathematics in real life in this book. These are two very important elements to come, either integrated in this book or as an independent document.

A note on convention
Although I am very much aware of the convention of writing commas and dots in center-aligned equations, I opted against this[2]. In this way, a center-aligned equation is a grammatical hybrid; it can end with both an invisible comma or dot, or nothing at all.

[1] To *explain* the rules rather than *proving* them is a deliberate decision. A proof demands mathematical rigor that often forces a lot of assumptions and definitions along the way. This can make the main insight disappear in the crowd of details. However, some of the explanations are valid as proofs.

[2] I've never liked the looks of it.

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