

Preface

If you are interested in learning about group theory in a relaxed, intuitive way, then this book is for you. I say learning *about* group theory because this book does not aim to cover group theory comprehensively. Herein you will find clear, illustrated exposition about the basics of the subject, which will give you a solid foundation of intuitions, images, and examples on which you can build with further study.

This book is ideal for a student beginning a first course in group theory. It can be used in place of a traditional textbook, or as a supplement to one, but its aim is quite different than that of a traditional text. Most textbooks present the theory of groups using theorems, proofs, and examples. Their exercises teach you how to make conjectures about groups and prove or refute them. This book, however, teaches you to *know* groups. You will see them, experiment with them, and understand their significance. The mental library of images and intuitions you gain from reading this book will enable you to appreciate far better the facts and proofs in a traditional text.

This book is also appropriate for recreational reading. If you want an overview of the theory of groups, or to learn key principles without going as deep as some upper-level undergraduate mathematics courses, you can read this book by itself. Only a typical high school mathematics education is assumed, but you should have a willingness to think analytically.

My work on this book stems from *Group Explorer*, a software package I wrote that creates illustrations for finite groups, and allows the user to interact and experiment with them. Many of the illustrations in this text were generated with the help of *Group Explorer*, and the investigations possible in *Group Explorer* can help you with some of this book's exercises.

You do not need *Group Explorer* to benefit from this book; very few exercises specifically direct you to *Group Explorer*. But I recommend taking full advantage of hands-on, interactive learning experiences when they're available; the more involved we are, the more we tend to learn. *Group Explorer* is free software, available for all major operating systems. You can find it online at

<http://grouplexplorer.sourceforge.net>.