Preface and Acknowledgments

This book was written with two groups of readers in mind. One comprises first year graduate students in mathematics who are either studying for their qualifying exams, or who want to learn the basics of this important subject. Since much of the content of this book originated in a one semester course I gave at the City University of New York Graduate Center, it would be very suitable for such an audience. The second group comprises advanced undergraduate mathematics or science majors. For this purpose there is enough material for a year-long course or, by concentrating on the first three chapters, for a semester course. The exposition is built around the fundamental concept of a holomorphic function in a planar domain and does not address more advanced topics such as Riemann surfaces. Although the material is classical, I believe it has been organized here in an especially efficient manner, getting basic complex analysis into about one hundred and thirty printed pages. Nevertheless, I have striven to relate and contrast the material with that of its sister, real analysis.

My own introduction to the subject occurred many years ago when, as an undergraduate, I read K. Knopp's paperback book [5]; some of the present material is informed by the treatment there. The proof of the Riemann mapping theorem for planar domains derives largely from Conway [1] although in somewhat greater detail than appears in his book. The same is true of holomorphic diffeomorphisms of annuli and

Rudin's book [10]. I have allowed myself the indulgence of including a short final chapter containing some applications of complex analysis to Lie theory and differential topology on which, of course, nothing else depends and which can be omitted if the reader's interests lie elsewhere.

Complex analysis is a beautiful subject, perhaps the single most beautiful and striking in mathematics. It contains completely unforseen results of a dramatic, one might even say magical character. One can imagine the excitement of its founders–first Cauchy, and then Riemann and Weierstrass–as each developed a better and better grasp of the terrain, proving major results one after the other. It is my hope that this compact book will convey to the student some of the excitement and extraordinary character of this subject.

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Martin Moskowitz, Summer 2001