

# Contents

<i>Preface</i>	v
1. Complex Numbers	1
2. Arguments and Polar Forms of Complex Numbers	5
3. Exponentials, Powers and Roots	9
4. Functions of a Complex Variable	13
5. Holomorphic Functions and the Cauchy–Riemann Equations	17
6. The Exponential, Trigonometric and Hyperbolic Functions	25
7. Logarithms, Complex Powers, Branches and Cuts	29
8. Contour Integrals and Path Independence	37
9. Cauchy’s Integral Theorems	45
10. Cauchy’s Integral Formulas	53
11. Taylor Series and Power Series	63
12. Laurent Series and Isolated Singularities	73

13. Residues	83
14. Trigonometric Integrals	89
15. Cauchy Principal Values of Improper Integrals on $(-\infty, \infty)$	93
16. Fourier Transforms of Rational Functions	99
17. Singular Integrals on $(-\infty, \infty)$	105
18. Integrals on Branch Cuts	109
19. Biholomorphisms	115
20. Zeros, Maximum Modulus Principle and Schwarz's Lemma	119
21. $\text{Aut}(\mathbb{D})$ and $\text{SU}(1, 1)$	125
22. $\text{Aut}(\mathbb{H})$ , $\text{SL}(2, \mathbb{R})$ and the Iwasawa Decomposition	131
23. Harmonic Functions and the Schwarz Problem on $\mathbb{D}$	137
<i>Bibliography</i>	147
<i>Index</i>	149