

Contents

Preface	v
1 Introduction	1
1 The Set \mathbb{N} of Natural Numbers	1
2 The Set \mathbb{Q} of Rational Numbers	6
3 The Set \mathbb{R} of Real Numbers	12
4 The Completeness Axiom	19
5 The Symbols $+\infty$ and $-\infty$	27
6 * A Development of \mathbb{R}	28
2 Sequences	31
7 Limits of Sequences	31
8 A Discussion about Proofs	37
9 Limit Theorems for Sequences	43
10 Monotone Sequences and Cauchy Sequences	54
11 Subsequences	63
12 \limsup 's and \liminf 's	75
13 * Some Topological Concepts in Metric Spaces	79
14 Series	90
15 Alternating Series and Integral Tests	100
16 * Decimal Expansions of Real Numbers	105
	ix

X Contents

3	Continuity	115
17	Continuous Functions	115
18	Properties of Continuous Functions	126
19	Uniform Continuity	132
20	Limits of Functions	145
21	* More on Metric Spaces: Continuity	156
22	* More on Metric Spaces: Connectedness	164
4	Sequences and Series of Functions	171
23	Power Series	171
24	Uniform Convergence	177
25	More on Uniform Convergence	184
26	Differentiation and Integration of Power Series . .	192
27	* Weierstrass's Approximation Theorem	200
5	Differentiation	205
28	Basic Properties of the Derivative	205
29	The Mean Value Theorem	213
30	* L'Hospital's Rule	222
31	Taylor's Theorem	230
6	Integration	243
32	The Riemann Integral	243
33	Properties of the Riemann Integral	253
34	Fundamental Theorem of Calculus	261
35	* Riemann-Stieltjes Integrals	268
36	* Improper Integrals	292
37	* A Discussion of Exponents and Logarithms . . .	299
	Appendix on Set Notation	309
	Selected Hints and Answers	311
	References	341
	Index	345
	Index	347



<http://www.springer.com/978-0-8176-3943-3>

Harmonic Analysis and Hypergroups

Ross, K. (Ed.)

1998, VI, 249 p., Hardcover

ISBN: 978-0-8176-3943-3

A product of Birkhäuser Basel