

# Contents

Preface	ix
<b>Part 1. Integration on compact intervals</b>	1
1. Gauges and integrals	3
2. Some examples	23
3. Basic properties of the integral	41
4. The Fundamental Theorems of Calculus	55
5. The Saks-Henstock lemma	75
6. Measurable functions	89
7. Absolute integrability	101
8. Convergence theorems	115
9. Integrability and mean convergence	135
10. Measure, measurability and multipliers	151
11. Modes of convergence	171
12. Applications to calculus	187
13. Substitution theorems	209
14. Absolute continuity	229
<b>Part 2. Integration on infinite intervals</b>	247
15. Introduction to Part 2	249
16. Infinite intervals	255
17. Further re-examination	275

18. Measurable sets	299
19. Measurable functions	323
20. Sequences of functions	347
<b>Appendices</b>	
A Limits superior and inferior	365
B Unbounded sets and sequences	371
C The arctangent lemma	373
D Outer measure	375
E Lebesgue's differentiation theorem	379
F Vector spaces	383
G Semimetric spaces	387
H The Riemann-Stieltjes integral	391
I Normed linear spaces	401
Some partial solutions	413
References	443
Index	449
Symbol Index	457