

# Contents

The Joy of Calculus . . . . .	1	23 Area Under a Curve . . . . .	213
<b>Quantifying Change</b> . . . . .	5	24 The Definite Integral . . . . .	221
1 Slope and Rate of Change . . . . .	5	25 Substitution Methods . . . . .	237
2 Limits . . . . .	13	26 Area Between Curves . . . . .	243
3 Limit Laws . . . . .	25	27 Volumes of Rotation . . . . .	249
4 Trigonometric Limits . . . . .	33	28 Average Values . . . . .	263
5 Asymptotes . . . . .	37	29 Integration by Parts . . . . .	271
6 Formal Theory of Limits . . . . .	47	30 Improper Integrals . . . . .	277
7 Continuity . . . . .	59	31 Trigonometric Integrals . . . . .	285
8 Calculus Without Limits . . . . .	73	32 Trigonometric Substitutions . . . . .	301
<b>Differential Calculus</b> . . . . .	83	33 Integrating Rational Functions . . . . .	311
9 Basic Formulas for Derivatives . . . . .	83	34 Numerical Integration . . . . .	327
10 Product and Quotient Rules . . . . .	95	35 Arc Length . . . . .	339
11 The Chain Rule . . . . .	103	<b>Mathematical Applications</b> . . . . .	345
12 Implicit Differentiation . . . . .	111	36 Parametric Equations . . . . .	345
13 Related Rates . . . . .	121	37 Polar Coordinates . . . . .	361
14 Inverse Functions . . . . .	129	38 Sequences . . . . .	377
15 Exponentials and Logarithms . . . . .	139	39 Series . . . . .	389
16 Indeterminate Limits . . . . .	155	40 Power Series . . . . .	415
17 Extreme Values . . . . .	161	41 Differential Equations . . . . .	431
18 Mean Value Theorem . . . . .	169	<b>Appendices</b> . . . . .	453
19 Curve Shape . . . . .	179	A Algebraic Formulas . . . . .	453
20 Optimization . . . . .	191	B Table of Derivatives . . . . .	457
21 Newton's Method . . . . .	197	C Table of Integrals . . . . .	459
<b>Integral Calculus</b> . . . . .	207	H Help! (where to get more) . . . . .	461
22 Antiderivatives . . . . .	207	Index . . . . .	465