Contents

ix
1
1
15
19
22
27
30
35
35
42
44
50
51
52
59
60
63
64
68
70
76

Chapter 4. Integral Calculus		79
4.1. The Riemann integral	l	81
4.2. The First Fundament	al Theorem of Calculus (a telescoping sum)	88
4.3. Change of variables for	or integration	91
4.4. Averages and the Mea	an Value Theorem for Integrals	92
4.5. Accumulation and the	e Second Fundamental Theorem of Calculus	93
4.6. Methods for finding a	ntiderivatives	95
Chapter 5. Discrete Dynamic	cal Systems	101
5.1. Iterating functions an	d types of orbits	101
5.2. The logistic map, mod	leling, and bifurcations	107
5.3. The doubling map an	d chaos	110
5.4. The tent map and frac	etals	115
5.5. The rotation map and	Benford's Law	120
5.6. The billiard map and	phase space	125
Chapter 6. Iterating Algorith	ms and Representations of Real Numbers	133
6.1. Iterating algorithms		134
6.2. Decimals and binaries	S	137
6.3. The Gauss map and c	ontinued fractions	139
6.4. The Euclidean algorit	hm and inscribing squares in rectangles	144
Appendix A. Definitions, Pro	oofs, and Mathematical Language	151
A.1. Writing mathematics		151
A.2. Writing definitions		153
A.3. Writing proofs		153
Appendix B. Sets and Functi	ons between Sets	159
B.1. The language of set the	neory	159
B.2. Functions between se	ets	163
Appendix C. Graphs		167
Appendix D. Hints to Selecte	ed Problems	173
Index		177