

CHAPTER 1	Preparation for Calculus	1
	1.1 Graphs and Models	2
	1.2 Linear Models and Rates of Change	10
	1.3 Functions and Their Graphs	19
	1.4 Fitting Models to Data	31
	1.5 Inverse Functions	37
	1.6 Exponential and Logarithmic Functions	49
	Review Exercises	57
	<i>P.S. Problem Solving</i>	59
CHAPTER 2	Limits and Their Properties	61
	2.1 A Preview of Calculus	62
	2.2 Finding Limits Graphically and Numerically	68
	2.3 Evaluating Limits Analytically	79
	2.4 Continuity and One-Sided Limits	90
	2.5 Infinite Limits	103
	SECTION PROJECT: Graphs and Limits of Trigonometric Functions	110
	Review Exercises	111
	<i>P.S. Problem Solving</i>	113
CHAPTER 3	Differentiation	115
	3.1 The Derivative and the Tangent Line Problem	116
	3.2 Basic Differentiation Rules and Rates of Change	127
	3.3 Product and Quotient Rules and Higher-Order Derivatives	140
	3.4 The Chain Rule	151
	3.5 Implicit Differentiation	166

SECTION PROJECT: Optical Illusions	174
3.6 Derivatives of Inverse Functions	175
3.7 Related Rates	182
3.8 Newton's Method	191
Review Exercises	197
<i>P.S. Problem Solving</i>	201

CHAPTER 4 Applications of Differentiation 203

4.1 Extrema on an Interval	204
4.2 Rolle's Theorem and the Mean Value Theorem	212
4.3 Increasing and Decreasing Functions and the First Derivative Test	219
SECTION PROJECT: Rainbows	229
4.4 Concavity and the Second Derivative Test	230
4.5 Limits at Infinity	238
4.6 A Summary of Curve Sketching	249
4.7 Optimization Problems	259
SECTION PROJECT: Connecticut River	270
4.8 Differentials	271
Review Exercises	278
<i>P.S. Problem Solving</i>	281

CHAPTER 5 Integration 283

5.1 Antiderivatives and Indefinite Integration	284
5.2 Area	295
5.3 Riemann Sums and Definite Integrals	307
5.4 The Fundamental Theorem of Calculus	318
SECTION PROJECT: Demonstrating the Fundamental Theorem	332
5.5 Integration by Substitution	333
5.6 Numerical Integration	347
5.7 The Natural Logarithmic Function: Integration	354
5.8 Inverse Trigonometric Functions: Integration	363
5.9 Hyperbolic Functions	371
SECTION PROJECT: St. Louis Arch	381
Review Exercises	382
<i>P.S. Problem Solving</i>	385

CHAPTER 6	Differential Equations	387
	6.1 Slope Fields and Euler's Method	388
	6.2 Differential Equations: Growth and Decay	397
	6.3 Differential Equations: Separation of Variables	405
	6.4 The Logistic Equation	419
	6.5 First-Order Linear Differential Equations	426
	SECTION PROJECT: Weight Loss	434
	6.6 Predator-Prey Differential Equations	435
	Review Exercises	442
	<i>P.S. Problem Solving</i>	445
CHAPTER 7	Applications of Integration	447
	7.1 Area of a Region Between Two Curves	448
	7.2 Volume: The Disk Method	458
	7.3 Volume: The Shell Method	469
	SECTION PROJECT: Saturn	477
	7.4 Arc Length and Surfaces of Revolution	478
	7.5 Work	489
	SECTION PROJECT: Tidal Energy	497
	7.6 Moments, Centers of Mass, and Centroids	498
	7.7 Fluid Pressure and Fluid Force	509
	Review Exercises	515
	<i>P.S. Problem Solving</i>	517
CHAPTER 8	Integration Techniques, L'Hôpital's Rule, and Improper Integrals	519
	8.1 Basic Integration Rules	520
	8.2 Integration by Parts	527
	8.3 Trigonometric Integrals	536
	SECTION PROJECT: Power Lines	544
	8.4 Trigonometric Substitution	545
	8.5 Partial Fractions	554
	8.6 Integration by Tables and Other Integration Techniques	563
	8.7 Indeterminate Forms and L'Hôpital's Rule	569
	8.8 Improper Integrals	580
	Review Exercises	591
	<i>P.S. Problem Solving</i>	593

CHAPTER 9	Infinite Series	595
	9.1 Sequences	596
	9.2 Series and Convergence	608
	SECTION PROJECT: Cantor's Disappearing Table	618
	9.3 The Integral Test and p -Series	619
	SECTION PROJECT: The Harmonic Series	625
	9.4 Comparisons of Series	626
	SECTION PROJECT: Solera Method	632
	9.5 Alternating Series	633
	9.6 The Ratio and Root Tests	641
	9.7 Taylor Polynomials and Approximations	650
	9.8 Power Series	661
	9.9 Representation of Functions by Power Series	671
	9.10 Taylor and Maclaurin Series	678
	Review Exercises	690
	<i>P.S. Problem Solving</i>	693

CHAPTER 10	Conics, Parametric Equations, and Polar Coordinates	695
	10.1 Conics and Calculus	696
	10.2 Plane Curves and Parametric Equations	711
	SECTION PROJECT: Cycloids	720
	10.3 Parametric Equations and Calculus	721
	10.4 Polar Coordinates and Polar Graphs	731
	SECTION PROJECT: Anamorphic Art	740
	10.5 Area and Arc Length in Polar Coordinates	741
	10.6 Polar Equations of Conics and Kepler's Laws	750
	Review Exercises	758
	<i>P.S. Problem Solving</i>	761

APPENDICES

Appendix A	Proofs of Selected Theorems	A2
Appendix B	Integration Tables	A19
Appendix C	Precalculus Review	A24
	C.1 Real Numbers and the Real Number Line	A24
	C.2 The Cartesian Plane	A31
	C.3 Review of Trigonometric Functions	A40

Answers to Odd-Numbered Exercises

A51

Index

A143

ADDITIONAL APPENDICES

Appendix D Rotation and the General Second-Degree Equation (Online)

Appendix E Complex Numbers (Online)

Appendix F Business and Economic Applications (Online)