

# Table of Contents

***Introduction* ..... 1**

What You'll Find .....	1
Beyond the Book .....	1
What you'll find online .....	2
How to register .....	2
Where to Go for Additional Help .....	2

***Part 1: The Questions* ..... 5**

**Chapter 1: Algebra Review . . . . . 7**

The Problems You'll Work On .....	7
What to Watch Out For .....	7
Simplifying Fractions .....	8
Simplifying Radicals .....	8
Writing Exponents Using Radical Notation .....	9
The Horizontal Line Test .....	9
Find Inverses Algebraically .....	9
The Domain and Range of a Function and Its Inverse .....	10
Linear Equations .....	10
Quadratic Equations .....	10
Solving Polynomial Equations by Factoring .....	11
Absolute Value Equations .....	11
Solving Rational Equations .....	11
Polynomial and Rational Inequalities .....	12
Absolute Value Inequalities .....	12
Graphing Common Functions .....	12
Domain and Range from a Graph .....	13
End Behavior of Polynomials .....	14
Adding Polynomials .....	14
Subtracting Polynomials .....	14
Multiplying Polynomials .....	15
Long Division of Polynomials .....	15

**Chapter 2: Trigonometry Review . . . . . 17**

The Problems You'll Work On .....	17
What to Watch Out For .....	17
Basic Trigonometry .....	18
Converting Degree Measure to Radian Measure .....	18
Converting Radian Measure to Degree Measure .....	19
Finding Angles in the Coordinate Plane .....	19
Finding Common Trigonometric Values .....	21
Simplifying Trigonometric Expressions .....	21
Solving Trigonometric Equations .....	22

Amplitude, Period, Phase Shift, and Midline.....	23
Equations of Periodic Functions.....	23
Inverse Trigonometric Function Basics.....	26
Solving Trigonometric Equations using Inverses.....	26
<b>Chapter 3: Limits and Rates of Change . . . . .</b>	<b>29</b>
The Problems You'll Work On .....	29
What to Watch Out For .....	29
Finding Limits from Graphs.....	30
Evaluating Limits .....	31
Applying the Squeeze Theorem.....	32
Evaluating Trigonometric Limits .....	33
Infinite Limits .....	33
Limits from Graphs.....	36
Limits at Infinity .....	37
Horizontal Asymptotes .....	38
Classifying Discontinuities .....	38
Continuity and Discontinuities .....	39
Making a Function Continuous .....	40
The Intermediate Value Theorem .....	41
<b>Chapter 4: Derivative Basics . . . . .</b>	<b>43</b>
The Problems You'll Work On .....	43
What to Watch Out For .....	43
Determining Differentiability from a Graph .....	44
Finding the Derivative by Using the Definition .....	45
Finding the Value of the Derivative Using a Graph .....	46
Using the Power Rule to Find Derivatives .....	47
Finding All Points on a Graph Where Tangent Lines Have a Given Value .....	48
<b>Chapter 5: The Product, Quotient, and Chain Rules . . . . .</b>	<b>49</b>
The Problems You'll Work On .....	49
What to Watch Out For .....	49
Using the Product Rule to Find Derivatives .....	50
Using the Quotient Rule to Find Derivatives.....	51
Using the Chain Rule to Find Derivatives .....	52
More Challenging Chain Rule Problems .....	53
<b>Chapter 6: Exponential and Logarithmic Functions and Tangent Lines . . . . .</b>	<b>55</b>
The Problems You'll Work On .....	55
What to Watch Out For .....	55
Derivatives Involving Logarithmic Functions .....	56
Logarithmic Differentiation to Find the Derivative .....	56
Finding Derivatives of Functions Involving Exponential Functions.....	57
Finding Equations of Tangent Lines .....	57
Finding Equations of Normal Lines .....	58

<b>Chapter 7: Implicit Differentiation</b> . . . . .	<b>59</b>
The Problems You'll Work On . . . . .	59
What to Watch Out For . . . . .	59
Using Implicit Differentiation to Find a Derivative . . . . .	60
Using Implicit Differentiation to Find a Second Derivative . . . . .	60
Finding Equations of Tangent Lines Using Implicit Differentiation . . . . .	61
<b>Chapter 8: Applications of Derivatives</b> . . . . .	<b>63</b>
The Problems You'll Work On . . . . .	63
What to Watch Out For . . . . .	63
Finding and Evaluating Differentials . . . . .	64
Finding Linearizations . . . . .	64
Using Linearizations to Estimate Values . . . . .	64
Understanding Related Rates . . . . .	64
Finding Maxima and Minima from Graphs . . . . .	66
Using the Closed Interval Method . . . . .	67
Finding Intervals of Increase and Decrease . . . . .	68
Using the First Derivative Test to Find Local Maxima and Minima . . . . .	68
Determining Concavity . . . . .	68
Identifying Inflection Points . . . . .	69
Using the Second Derivative Test to Find Local Maxima and Minima . . . . .	69
Applying Rolle's Theorem . . . . .	69
Using the Mean Value Theorem . . . . .	70
Applying the Mean Value Theorem to Solve Problems . . . . .	70
Relating Velocity and Position . . . . .	70
Finding Velocity and Speed . . . . .	70
Solving Optimization Problems . . . . .	71
Doing Approximations Using Newton's Method . . . . .	73
Approximating Roots Using Newton's Method . . . . .	73
<b>Chapter 9: Areas and Riemann Sums</b> . . . . .	<b>75</b>
The Problems You'll Work On . . . . .	75
What to Watch Out For . . . . .	75
Calculating Riemann Sums Using Left Endpoints . . . . .	76
Calculating Riemann Sums Using Right Endpoints . . . . .	76
Calculating Riemann Sums Using Midpoints . . . . .	77
Using Limits and Riemann Sums to Find Expressions for Definite Integrals . . . . .	77
Finding a Definite Integral from the Limit and Riemann Sum Form . . . . .	78
Using Limits and Riemann Sums to Evaluate Definite Integrals . . . . .	78



<b>Chapter 10: The Fundamental Theorem of Calculus and the Net Change Theorem</b> . . . . .	<b>79</b>
The Problems You'll Work On . . . . .	79
What to Watch Out For . . . . .	79
Using the Fundamental Theorem of Calculus to Find Derivatives . . . . .	80
Working with Basic Examples of Definite Integrals . . . . .	80
Understanding Basic Indefinite Integrals . . . . .	81
Understanding the Net Change Theorem . . . . .	84
Finding the Displacement of a Particle Given the Velocity . . . . .	85
Finding the Distance Traveled by a Particle Given the Velocity . . . . .	85
Finding the Displacement of a Particle Given Acceleration . . . . .	86
Finding the Distance Traveled by a Particle Given Acceleration . . . . .	86
<b>Chapter 11: Applications of Integration</b> . . . . .	<b>87</b>
The Problems You'll Work On . . . . .	87
What to Watch Out For . . . . .	87
Areas between Curves . . . . .	88
Finding Volumes Using Disks and Washers . . . . .	89
Finding Volume Using Cross-Sectional Slices . . . . .	91
Finding Volumes Using Cylindrical Shells . . . . .	92
Work Problems . . . . .	94
Average Value of a Function . . . . .	97
<b>Chapter 12: Inverse Trigonometric Functions, Hyperbolic Functions, and L'Hôpital's Rule</b> . . . . .	<b>99</b>
The Problems You'll Work On . . . . .	99
What to Watch Out For . . . . .	99
Finding Derivatives Involving Inverse Trigonometric Functions . . . . .	100
Finding Antiderivatives by Using Inverse Trigonometric Functions . . . . .	101
Evaluating Hyperbolic Functions Using Their Definitions . . . . .	101
Finding Derivatives of Hyperbolic Functions . . . . .	102
Finding Antiderivatives of Hyperbolic Functions . . . . .	102
Evaluating Indeterminate Forms Using L'Hôpital's Rule . . . . .	103
<b>Chapter 13: U-Substitution and Integration by Parts</b> . . . . .	<b>107</b>
The Problems You'll Work On . . . . .	107
What to Watch Out For . . . . .	107
Using u-Substitutions . . . . .	108
Using Integration by Parts . . . . .	109

<b>Chapter 14: Trigonometric Integrals, Trigonometric Substitution, and Partial Fractions</b> .....	<b>113</b>
The Problems You'll Work On .....	113
What to Watch Out For .....	114
Trigonometric Integrals .....	114
Trigonometric Substitutions .....	116
Finding Partial Fraction Decompositions (without Coefficients).....	117
Finding Partial Fraction Decompositions (Including Coefficients).....	118
Integrals Involving Partial Fractions .....	118
Rationalizing Substitutions .....	119
 <b>Chapter 15: Improper Integrals and More Approximating Techniques</b> .....	 <b>121</b>
The Problems You'll Work On .....	121
What to Watch Out For .....	121
Convergent and Divergent Improper Integrals .....	122
The Comparison Test for Integrals .....	123
The Trapezoid Rule .....	124
Simpson's Rule.....	124
 <b>Part II: The Answers</b> .....	 <b>125</b>
<b>Chapter 16: Answers and Explanations</b> .....	<b>127</b>
 <b>Index</b> .....	 <b>595</b>

