

Contents

Preface

Chapter 1

Polynomial Functions	1
Prerequisite Skills	2
1.1 Power Functions	4
1.2 Characteristics of Polynomial Functions	15
1.3 Equations and Graphs of Polynomial Functions	30
1.4 Transformations	42
1.5 Slopes of Secants and Average Rate of Change	53
1.6 Slopes of Tangents and Instantaneous Rate of Change	65
Review	74
Practice Test	78
Task: Create Your Own Water Park	80

Chapter 2

Polynomial Equations and Inequalities	81
Prerequisite Skills	82
2.1 The Remainder Theorem	84
2.2 The Factor Theorem	94
2.3 Polynomial Equations	104
2.4 Families of Polynomial Functions	113
2.5 Solve Inequalities Using Technology	123
2.6 Solve Factorable Polynomial Inequalities Algebraically	132
Review	140
Practice Test	142
Task: Can You Tell Just by Looking?	144

Chapter 3

Rational Functions	145
Prerequisite Skills	146
3.1 Reciprocal of a Linear Function	148
Extension: Asymptotes and the TI-83 Plus or TI-84 Plus Graphing Calculator	156
3.2 Reciprocal of a Quadratic Function	157
3.3 Rational Functions of the Form $f(x) = \frac{ax + b}{cx + d}$	168
3.4 Solve Rational Equations and Inequalities	177
3.5 Making Connections With Rational Functions and Equations	186
Review	192
Practice Test	194
Chapters 1 to 3 Review	196
Task: ZENN and Now	198

Chapter 4

Trigonometry	199
Prerequisite Skills	200
4.1 Radian Measure	202
4.2 Trigonometric Ratios and Special Angles	211
4.3 Equivalent Trigonometric Expressions	220
4.4 Compound Angle Formulas	228
4.5 Prove Trigonometric Identities	236
Extension: Use <i>The Geometer's Sketchpad</i> ® to Sketch and Manipulate Three-Dimensional Structures in a Two-Dimensional Representation	242
Review	244
Practice Test	246
Task: Make Your Own Identity	248

Chapter 5

Trigonometric Functions	249
Prerequisite Skills	250
5.1 Graphs of Sine, Cosine, and Tangent Functions	252
5.2 Graphs of Reciprocal Trigonometric Functions	261
5.3 Sinusoidal Functions of the Form $f(x) = a \sin [k(x - d)] + c$ and $f(x) = a \cos [k(x - d)] + c$	270
Extension: Use a Graphing Calculator to Fit a Sinusoidal Regression to Given Data	280
5.4 Solve Trigonometric Equations	282
5.5 Making Connections and Instantaneous Rate of Change	290
Review	300
Practice Test	302
Chapters 4 and 5 Review	304
Task: Predators and Prey	306

Chapter 6

Exponential and Logarithmic Functions	307
Prerequisite Skills	308
6.1 The Exponential Function and Its Inverse	310
6.2 Logarithms	323
6.3 Transformations of Logarithmic Functions	331
6.4 Power Law of Logarithms	341
6.5 Making Connections: Logarithmic Scales in the Physical Sciences	349
Review	356
Practice Test	358
Task: Not Fatal	360

Chapter 7

Tools and Strategies for Solving Exponential and Logarithmic Equations	361
Prerequisite Skills	362
7.1 Equivalent Forms of Exponential Equations	364
7.2 Techniques for Solving Exponential Equations	370
7.3 Product and Quotient Laws of Logarithms	378
7.4 Techniques for Solving Logarithmic Equations	387
7.5 Making Connections: Mathematical Modelling With Exponential and Logarithmic Equations	393
Review	408
Practice Test	410
Task: Make Your Own Slide Rule	412

Chapter 8

Combining Functions	413
Prerequisite Skills	414
8.1 Sums and Differences of Functions	416
8.2 Products and Quotients of Functions	429
8.3 Composite Functions	439
8.4 Inequalities of Combined Functions	450
8.5 Making Connections: Modelling With Combined Functions	461
Review	472
Practice Test	474
Chapters 6 to 8 Review	476
Task: Modelling a Damped Pendulum	478
Course Review	479
Prerequisite Skills Appendix	484
Technology Appendix	505
Answers	524
Glossary	586
Index	595
Credits	600