



General Mathematics

Lynie Dimasuay
Jeric Alcala
Jane Palacio
Authors

Alleli Ester Domingo
Coordinator

Table of Contents

| | |
|-----------------------|------|
| List of Figures | viii |
| List of Tables | x |
| Preface | xi |

CHAPTER 1 Functions and Their Graphs

| | |
|---|----|
| Diagnostic Test | 1 |
| Lesson 1: Concept of Functions | 3 |
| Lesson 2: Operations on Functions | 8 |
| Lesson 3: Functions as Mathematical Models | 11 |
| Lesson 4: Concept of Rational Functions | 17 |
| Long Test 1 | 19 |
| Lesson 5: Solving Rational Equations | 25 |
| Lesson 6: Solving Rational Inequalities | 27 |
| Lesson 7: Graphs of Rational Functions | 29 |
| Lesson 8: Concept of Inverse Functions | 32 |
| Long Test 2 | 38 |
| Chapter Summary | 40 |
| Chapter Test | 42 |

CHAPTER 2 Exponential and Logarithmic Functions

| | |
|---|----|
| Diagnostic Test | 45 |
| Lesson 1: Concept of Exponential Functions | 48 |
| Lesson 2: Graphs of Exponential Functions | 50 |
| Lesson 3: Concept of Logarithmic Functions | 55 |
| Lesson 4: Graphs of Logarithmic Functions | 58 |
| Long Test 3 | 61 |

| | | |
|------------------|---|----|
| Lesson 5: | Solving Exponential and Logarithmic Equations | 62 |
| Lesson 6: | Solving Exponential and Logarithmic Inequalities | 67 |
| Lesson 7: | Applications of Exponential and Logarithmic Functions | 70 |
| | Long Test 4 | 77 |
| | Chapter Summary | 79 |
| | Chapter Test | 81 |

CHAPTER 3 Business Mathematics

| | | |
|-------------------|---|-----|
| | Diagnostic Test | 83 |
| Lesson 1: | Simple Interest | 85 |
| Lesson 2: | Compound Interest | 92 |
| Lesson 3: | Effective Rate of Interest | 102 |
| Lesson 4: | Future Value of Annuities | 106 |
| Lesson 5: | Present Value of Annuities | 112 |
| | Long Test 5 | 118 |
| Lesson 6: | Sinking Funds and Loan Amortization | 120 |
| Lesson 7: | Deferred Annuities | 129 |
| Lesson 8: | Bonds | 139 |
| Lesson 9: | Stocks and Stock Markets | 145 |
| Lesson 10: | Valuation of Stocks and the Efficient Market Hypothesis | 150 |
| | Long Test 6 | 154 |
| | Chapter Summary | 156 |
| | Chapter Test | 160 |

CHAPTER 4 Logic

| | |
|---|-----|
| Diagnostic Test | 163 |
| Lesson 1: Propositions | 167 |
| Lesson 2: Simple and Compound Propositions | 170 |
| Lesson 3: Truth Value of Compound Propositions | 177 |
| Lesson 4: Logical Equivalence | 180 |
| Lesson 5: Categorical Propositions | 183 |
| Long Test 7 | 186 |
| Lesson 6: Validity and Soundness of Deductive Arguments | 189 |
| Lesson 7: Determining Validity of Arguments Using Truth Tables | 193 |
| Lesson 8: Rules of Inference and the Direct Proof | 196 |
| Lesson 9: Indirect Proof | 200 |
| Lesson 10: Informal Proofs and Disproofs | 204 |
| Lesson 11: Informal Fallacies | 210 |
| Long Test 8 | 220 |
| Chapter Summary | 222 |
| Chapter Test | 223 |
| Glossary | 227 |
| Index | 231 |
| References | 234 |
| About the Authors | 235 |

Index

Annuity, 106

Amortization, 124

Annuity-due, 106

Deferred annuity, 129

Period of deferral, 129

Future value, 107

Ordinary annuity, 106

Present value, 113

Sinking fund, 120

Exponential function, 48

Applications, 70

Exponential decay, 72

Exponential growth, 70

Half-life, 73

Newton's Rate of Cooling, 73

Exponential equation, 48

Exponential inequality, 48

Graphs, 50

Properties, 51

Fallacy, 192

Formal fallacy, 194

Informal fallacy, 210

Fallacy of numbers, 217

Appeal to numbers, 218

Appeal to popularity, 217

False cause, 218

Hasty generalization, 218

Fallacy of relevance, 211

Appeal to emotion, 212

Appeal to force, 212

Begging the question
(circular reasoning), 215

Ignorance, 211

Inappropriate appeal
to authority, 213

Limited choice, 211

Non sequitur, 215

Personal attack, 214

Red herring, 216

Straw man, 216

Subjectivism, 211

Weak analogy, 217

Function 2, 3

Composite function, 8

Difference function, 8

Domain, 3

Inverse function, 32

Mathematical modeling, 11

Constant of proportionality, 14

Directly proportional, 14

Inversely proportional, 14

Jointly proportional 15

One-to-one Function, 32

Horizontal line test, 32

Piece-wise function, 6

Product function, 8

Quotient function, 8

Range, 3

Relation, 2

Sum function, 8

Interest, 85

Compound interest, 92, 93

Compounding period, 96

Continuous compounding, 98

Present value, 99

Effective rate, 102

Nominal rate, 102

Simple interest, 85

Future value, 87

Present value, 88

Logarithmic function, 55

Application, 70

Decibel scale, 75

Richter scale, 74

Graphs, 58

Logarithmic equation, 55

Logarithmic inequality, 55

Logical equivalence, 180

Contraposition, 181

Laws of equivalence (rules of replacement), 182

Proposition, 167

Categorical proposition, 183

Compound proposition, 170

Biconditional, 173

Conditional proposition, 171

Inverse, 171

Converse, 171

Contrapositive, 171

Conjunction, 171

Disjunction, 171

Negation, 170

Paradox, 167

Simple proposition, 170

Truth value, 177

Contradiction, 178

Tautology, 179

Contingency, 179

Rational function, 17

Graph, 29

Asymptote, 29

Horizontal, 30

Vertical, 29

Rational equation, 17

Rational inequality, 17

Critical number, 27

Security, 139

Bond, 139

Coupons, 139

Zero-coupon bond, 140

Face value, 139

Maturity date, 139

Yield-to-maturity, 140

Efficient Market Hypothesis, 153

Forms, 153

Stock, 145

Capital gain, 145

Common stock, 146

Dividend, 145

Constant Growth Model, 151

Zero Growth Model, 151

Equity, 148

Market index, 147

Preferred stock, 146

Stock holder, 145

Stock market, 147

Syllogism, 191

Categorical syllogism, 191

Constructive proof of existence, 192

Validity of argument, 193

Direct proof, 198

Indirect proof, 200

Modus ponens, 193

Rules of inference, 196