

CONTENTS

Preface ix

PART I REASONING AND LANGUAGE 1

1. Truth and Validity 2

- 1.1 Arguments 3
- 1.2 Recognizing Arguments 6
- 1.3 Good Arguments 17
- 1.4 Reliability 20
- 1.5 Implication and Equivalence 24
- 1.6 Logical Properties of Sentences 29

2. Evidence and Relevance 37

- 2.1 Begging the Question 38
- 2.2 Complex Questions 43
- 2.3 Relevance: Refutations 46
- 2.4 Relevance: Confusing the Issue 56

3. Grounding 62

- 3.1 Appeals to Emotion 64
- 3.2 Practical Fallacies 69
- 3.3 Superficiality 78

4. Meaning 90

- 4.1 Equivocation 90
- 4.2 Amphiboly 93
- 4.3 Accent 99
- 4.4 Composition and Division 101
- 4.5 Traditional Criteria for Definitions 104

PART II SENTENTIAL LOGIC 113

5. Sentences 114

- 5.1 Sentence Connectives 114
- 5.2 A Sentential Language 117
- 5.3 Truth Functions 121
- 5.4 *Symbolization* 125
- 5.5 *Validity* 133

6. Truth Tables 139

- 6.1 Truth Tables for Formulas 139
- 6.2 Other Uses of Truth Tables 145

7. Semantic Tableaux 155

- 7.1 Rules for Negation, Conjunction, and Disjunction 160
- 7.2 Rules for the Conditional and Biconditional 167
- 7.3 Decision Procedures 172

8. Deduction 186

- 8.1 Proofs 186
- 8.2 Conjunction and Negation Rules 188
- 8.3 Conditional and Biconditional Rules 193
- 8.4 Disjunction Rules 197
- 8.5 Rules of Definition 201
- 8.6 Derived Rules 208
- 8.7 Indirect Proof 225

PART III PREDICATE LOGIC 229

9. Syllogisms 230

- 9.1 Categorical Sentences 231
- 9.2 Diagramming Categorical Sentence Forms 236
- 9.3 Immediate Inference 242
- 9.4 Syllogisms 253
- 9.5 Rules for Validity 263
- 9.6 Expanding the Aristotelian Language 276

10. Quantifiers 289

- 10.1 Constants and Quantifiers 290
- 10.2 Categorical Sentence Forms 294
- 10.3 Polyadic Predicates 298
- 10.4 The Language QL 303

11. Symbolization 311

- 11.1 Noun Phrases 311
- 11.2 Verb Phrases 322
- 11.3 Definitions 331

12. Quantified Tableaux 340

- 12.1 Quantifier Tableau Rules 340
- 12.2 Strategies 344

13. Quantified Deduction 358

- 13.1 Deduction Rules for Quantifiers 358
- 13.2 Universal Generalization 366
- 13.3 Formulas with Overlapping Quantifiers 372
- 13.4 Quantifiers and Connectives 376

PART IV INDUCTIVE REASONING 393

14. Generalizations 394

- 14.1 Inductive Reliability 395
- 14.2 Enumeration 398
- 14.3 Evaluating Enumerations 400
- 14.4 Statistical Generalizations 403
- 14.5 Analogies 412

15. Causes 425

- 15.1 Kinds of Causes 425
- 15.2 Agreement and Difference 431
- 15.3 Residues and Concomitant Variation 440
- 15.4 Causal Fallacies 447

16. Explanations 450

- 16.1 Explanations and Hypothetical Reasoning 450
- 16.2 Scientific Theories 458
- 16.3 Evaluating Explanations 464

APPENDIX I DEDUCTION: STYLE TWO 472

A: Sentential Logic 472

- A.1 Proofs 472
- A.2 Conjunction and Negation Rules 475

A.3 Conditional and Biconditional Rules 481

A.4 Disjunction Rules 484

A.5 Derived Rules 486

B. Adding Quantifiers 501

B.1 Deduction Rules for Quantifiers 501

B.2 Universal Generalization 506

B.3 Formulas with Overlapping Quantifiers 508

B.4 Derived Rules for Quantifiers 512

APPENDIX II DEDUCTION: STYLE THREE 518

A: Sentential Logic 518

A.1 Proofs 518

A.2 Conjunction and Negation Rules 522

A.3 Conditional and Biconditional Rules 529

A.4 Disjunction Rules 533

A.5 Derived Rules 535

B: Adding Quantifiers 551

B.1 Deduction Rules for Quantifiers 551

B.2 Universal Proof 556

B.3 Derived Rules for Quantifiers 557

Bibliography 563

Answers to Selected Problems 565

Index 699