

# CONTENTS

<i>Preface</i>	<i>vii</i>
<b>PART ONE: Compound Statements</b>	<b>1</b>
<b>1 INTRODUCTION</b>	<b>3</b>
Statements and Sentences, 4. Conjunction, Disjunction, Denial, 7. Rules of Formation and Valuation, 11. Exercises, 16	
<b>2 LOGICAL EQUIVALENCE</b>	<b>19</b>
Laws of Equivalence, 21. Simplification, 21. Grouping, 26. Semantical Equivalence, 27. Tautologies and Contradictions, 29. Exercises, 31. Supplements: Boolean Algebra, 32. Logical Net- works, 34. Meanings as Sets, 36	
<b>3 TRUTH-FUNCTIONS</b>	<b>41</b>
Normal Forms, 45. Conditionals, 49. Translation, 53. Non-truth-functional Connectives, 55. Exercises, 57	
<b>4 TRUTH TREES</b>	<b>63</b>
An Example, 64. Further Examples and Solutions, 69. Rules of Inference, 72. Comments on the Rules, 75. Exercises, 78	
<b>5 ADEQUACY OF THE METHOD. TREES AND PROOFS</b>	<b>81</b>
Preliminaries, 82. Proof of <b>5.2</b> , 86. Proof of <b>5.3</b> , 89. Direct and Indirect Proofs, 90. Coupled Trees, 93. Exercises, 98	

<b>PART TWO: Quantification</b>	<b>101</b>
<b>6 INFERENCE RULES FOR QUANTIFIERS</b>	<b>103</b>
An Example, 104. Further Examples and Solutions, 107. The Complete Method, 111. Applying the Rules, 114. Logical Structure, 117. Solved Exercises, 119. Further Exercises, 124	
<b>7 MULTIPLE QUANTIFICATION. TRANSLATION</b>	<b>125</b>
Interpretation of Quantifiers, 127. Linkage, 130. Translation: Categorical Statements, 135. Tense, 137. Choosing a Universe of Discourse, 138. Restricted Quantifiers, 139. An Example, 141. Infinite Trees, 142. Solved Exercises, 144. Further Exercises, 145	
<b>8 ADEQUACY OF THE TREE METHOD</b>	<b>149</b>
Infinite Trees, 150. The Tree Theorem, 151. Rules of Formation, 154. Stories, 156. Rules of Valuation, 159. Correctness of the Rules, 164. Proof of 8.2, 168. Proof of 8.3, 169. Conclusion, 171. Exercises, 172	
<b>9 IDENTITY. FUNCTIONS</b>	<b>173</b>
Existence, 174. Definite Descriptions, 174. Number, 176. Inference Rules for Identity, 177. Solved Examples, 180. Functions, 182. Solved Examples, 185. Mathematical Reasoning, 186. Groups, 186. Infinite Trees Again, 190. Adequacy, 192. Exercises, 192	
<b>10 UNDECIDABILITY. INCOMPLETENESS</b>	<b>195</b>
The Fragment A of Arithmetic, 196. Representability, 198. Church's Thesis, 200. Arithmetization, 202. Decidable Sets of Expressions. Substitution, 207. The Set $N^*$ , 208. Self-reference. Church's Theorem, 210. Another Form of Church's Theorem, 214. The Unaxiomatizability of Arithmetic, 217. Exercises, 221	
<i>Guide to Further Study</i>	<b>225</b>
Notations, 225. Alternatives to the Tree Method, 227. Higher-order Logic, 228. Type Theory, 228. Set Theory, 229. Metamathematics, 230. Semantics, 231. Modal Logic, 231	
<i>Bibliography</i>	<b>233</b>
<i>Index</i>	<b>235</b>