

# Table of Contents

## *Chapter One*

- |   |    |
|---|----|
| 1. Logical form   | 3  |
| 2. Variables; statement-forms; valid forms of inference;<br>and the relation of implication | 10 |
| 3. The construction of proofs by reference to valid forms<br>of inference                   | 14 |
| 4. Standard forms of expression; the elimination of double<br>negatives                     | 18 |

## *Chapter Two*

- |   |    |
|---|----|
| 5. The construction of truth tables   | 23 |
| 6. Use of the truth table as a check on validity                                  | 26 |
| 7. Extension of the truth table; the biconditional                                | 33 |
| 8. Valid and contravalid statements   | 36 |
| 9. The relation of implication and the theoretical position<br>of the truth table | 39 |

## *Chapter Three*

- |   |    |
|---|----|
| 10. Definition of implication and equivalence   | 47 |
| 11. Valid conditionals and biconditionals as reference<br>formulas  | 49 |
| 12. Rule permitting interchange of equivalent expressions;<br>the introduction and elimination of double negatives    | 51 |
| 13. Selection and classification of reference formulas  | 53 |
| 14. Rule for obtaining a conjunction of separately listed<br>premises; the introduction of valid statements in proofs | 60 |
| 15. The construction of proofs  | 63 |
| 16. Consistency   | 70 |

*Chapter Four*

17. The formal analysis of generalized statements	72
18. Standard forms of expression for generalized statements	79
19. Formulation of a rule of substitution for predicate and term variables; definition of "scope"	82
20. The syllogism principle; the rule of interchange for quantified expressions	88
21. Equivalence relations between quantified statements; distribution of quantification symbols; implications between generalized and singular statements	93

*Chapter Five*

22. Relations and multiple quantification	101
23. Changing the order and scope of quantification symbols; rewriting bound variables	109
24. Identity	120
25. Conditional proofs; the construction of proofs with quantification symbols omitted	126
26. The restriction of a generalization to a limited range of objects	140
27. Definitions and postulates; the classification of relations	149
28. Descriptions	158

*Chapter Six*

29. The systematic development of logic	166
30. The deduction of theorems in a logical calculus	176
31. A note on the construction of deductive systems	190
32. Classes and the extension of the logical calculus	201
33. The theory of types	214

*Chapter Seven*

34. The position of logic and mathematics in ordinary reasoning	223
35. The classification of numbers	230

TABLE OF CONTENTS	xi
36. A postulate set for the real number system	236
37. The definition of real numbers, rational numbers, and integers	253
38. The Peano postulates for the natural number system	271
39. The class definition of number	281
 <i>Chapter Eight</i>	
40. Terms and propositions	296
41. Quantity and quality of propositions	298
42. Distribution of terms	299
43. The syllogism	301
44. The validity of syllogisms	306
45. Immediate inference; the square of opposition	309
46. Immediate inference ( <i>cont.</i> )	312
47. Hypothetical syllogisms	316
48. Disjunctive syllogisms	321
49. Reduction of syllogisms	325
50. A note on classical and symbolic methods of analysis	329
 <i>Exercises</i>	 343
 <i>Index</i>	 373