

Table of Contents

Editor's Preface	7
Preface	13
Acknowledgements	17
CHAPTER I. <i>Semantical and Syntactical Aspects of Elementary Mathematical Theories</i>	
I.1.	Introduction to the Elementary Predicate Calculus without Equality 19
I.2.	Semantical Interpretation of the Propositional Calculus 27
I.3.	Semantical Interpretation of the Elementary Predicate Calculus 30
I.4.	Decision Procedure for the Elementary Predicate Calculus 33
I.5.	Predicate Calculus – the Theory Z 40
I.6.	Gödel's Incompleteness Theorem 49
I.7.	The Incompleteness Theorems and Semantics 55
I.8.	Remarks on Non-Standard Mathematics 60
CHAPTER II. <i>Epistemological Aspects of Mathematics in Historical Perspective</i>	
II.1.	Introduction 66
II.2.	The Philosophy of Mathematics in History 67

II.2.1	Greek Mathematics	67
II.2.2.	From Hellenistic Philosophy to Modern Rationalism	80
II.2.3.	The Period in Early Modern Philosophy	82
II.2.3.1.	Descartes (1596-1650)	83
II.2.3.2.	Newton (1642-1727)	86
II.2.3.3.	Leibniz (1646-1716)	87
II.2.3.4.	Kant (1724-1804)	94
II.3.	Transition to the Present Century	98
II.4.	Directions in the 20th Century Philosophy of Mathematics	102
II.4.1.	Logicism	102
II.4.1.1.	Frege (1848-1925)	103
II.4.1.2.	Russell (1872-1970)	105
II.4.2.	Intuitionism	109
II.4.2.1.	Poincaré (1854-1912)	110
II.4.2.2.	Brouwer (1881-1966)	117
II.4.2.3.	The 'Bourbaki' Group	120
II.4.3.	Formalism	123
CHAPTER III. <i>An Outline of a Complementary Approach to Mathematics</i>		
III.1.	Facets and Methods of a Philosophy of Mathematics	128
III.2.	Two Kinds of Mathematical Existence	134
III.3.	Language, Set Theory and Mathematical Complementarity	141
III.4.	Complementarist Set Theory – an Outline	148
III.5.	The Unity of Mathematics: Algebra and Topology	154
III.6.	Bridging the Abyss Between the Discrete and the Continuous	162

Selected Bibliography	171
References for Further Study	175
Index of Names	178
Index of Subjects	182