

CONTENTS

1

Introduction, 1

Philosophical problems about mathematics, 1. A priori and empirical knowledge, 3. Analytic and synthetic knowledge, 7. The open texture of language, 10.

2

Euclidean Geometry, 15

Egyptians and Greeks, 15. Euclid's procedure, 16. Euclid's postulates, 18. Euclid's axioms and definitions, 20. Euclid's theorems, 21. A modern view of deductive systems, 22. The motive for axiomatizing, 24. Geometry as a priori knowledge, 26. Geometry as synthetic knowledge, 29.

3

Non-Euclidean Geometry, 32

Euclid's fifth postulate, 32. Sacchieri, 33. Lobachevskian geometry, 35. Riemannian geometry, 36. The problem of consistency, 37. Logical gaps in Euclid's "Elements," 38. Deductive systems abstractly viewed, 40. Uninterpreted geometry and interpretations of it, 42. Inconsistency, 45. Interpreted geometry as empirical, 48. Interpreted geometry as a priori, 50. Significance of the a priori interpretation, 53.

4

**Numbers and
Literalistic
Philosophies of
Number, 56**

The natural numbers, 58. Defining higher kinds of numbers, 61. Transfinite numbers, 63. Should we try to interpret number theory? 67. Nominalism, 69. Conceptualism and the intuitionists, 72. Realism and the logistic thesis, 78.

5

**Transition to a
Nonliteralistic
View of Number, 82**

The paradoxes, 82. The theory of types, 85. Other ways around the paradoxes, 89. Formalized deductive systems, 91. Incompleteness, 94. Formalism, 97. The laws of number as analytic, 100.

**For Further
Reading, 105**

Index, 109