

Contents

Introduction	v
Part I. Proofs of Impossibility, Proofs of Nonexistence	1
1. Proofs of Irrationality	3
2. The Elements of the Theory of Geometric Constructions	11
3. Constructible Regular Polygons	17
4. Some Basic Facts About Linear Spaces and Fields	21
5. Algebraic and Transcendental Numbers	27
6. Cauchy's Functional Equation	33
7. Geometric Decompositions	39
Part II. Constructions, Proofs of Existence	47
8. The Pigeonhole Principle	49
9. Liouville Numbers	55
10. Countable and Uncountable Sets	59
11. Isometries of \mathbf{R}^n	67
12. The Problem of Invariant Measures	75
13. The Banach–Tarski Paradox	81
14. Open and Closed Sets in \mathbf{R} . The Cantor Set	85
15. The Peano Curve	93
16. Borel Sets	97
17. The Diagonal Method	103

References 107
Hints 109
Index 117