

# Contents

1. Introduction	1
2. Getting Started	4
3. Euclid's <i>Elements</i>	9
<i>Euclid, 1732</i>	12
4. Thales' Theorem	14
<i>The Mathematical World of Ancient Greece</i>	18
5. Geometry in Action	20
6. Pythagoras' Theorem	26
7. 'In Love with Geometry'?	36
<i>371 Proofs of Pythagoras</i>	42
8. 'Imagine my Exultation, Watson...'	44
9. Congruence and Similarity	50
<i>The Golden Ratio</i>	58
10. Conversely...	60
11. Circle Theorems	68
12. Off at a Tangent	73
13. From Tangents to Supersonic Flow	79
<i>Galileo and Thales' Theorem</i>	84
14. What is $\pi$ , Exactly?	86
15. The Story of the Ellipse	94

16. Geometry by Coordinates	101
<i>Inspector Euclid Investigates...</i>	106
17. Geometry and Calculus	108
18. A Royal Road to Geometry?	114
19. Unexpected Meetings	122
20. Ceva's Theorem	129
<i>Some Further Slices of Pi</i>	136
21. A Kind of Symmetry	138
22. 'Pyracy' in Woolwich?	145
23. Fermat's Problem	154
24. A Soap Solution	164
25. Geometry in <i>The Ladies' Diary</i>	171
<i>Euclid, 1847</i>	178
26. What Euclid Did	180
27. Euclid on Parallel Lines	189
<i>Proof by Picture?</i>	196
28. 'A New Theory of Parallels'?	198
29. Anti-Euclid?	205
30. When Geometry Goes Wrong...	213
31. New Angles on Geometry	223
32. And Finally...	231

Notes	241
Further Reading	265
Acknowledgements	269
Publisher's Acknowledgements	270
Picture Credits	271
Index	273