

“DANA MACKENZIE  
IS A VERY GOOD WRITER.  
I WAS CONSTANTLY AMAZED  
AT HIS ABILITY TO DESCRIBE  
COMPLICATED MATHEMATICS  
IN A FEW SENTENCES IN A WAY  
THAT THE AVERAGE READER - CAN  
UNDERSTAND. THIS IS A VERY  
ENTERTAINING BOOK.”

David S. Richeson, author of *Euler's Gem: The Polyhedron Formula and the Birth of Topology*

In riveting narrative, Dana Mackenzie brings to life the history of mathematical development as it has unfolded in the lives and work of its greatest figures. Along the way from zero to infinity, he uncovers the beauty of an exceptional 24 equations that are surprising, consequential and universal. Discover:

- How mathematics got personal (and nasty) in 16th century Italy;
- How Newton and Leibniz unlocked the key to mastering infinity with the fundamental theorem of calculus;
- How Newton's Laws of Motion enable humans to do everything from building bridges to predicting the weather.
- How Fermat's Last Theorem was solved after 350 years.


£16.99

ISBN 978-1-911130-70-3



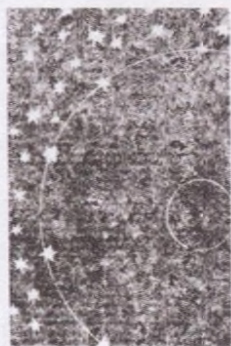
9 781911 130703

[www.modern-books.com](http://www.modern-books.com)

 modern books



preface	6
introduction: the abacist versus the algorist	10
part one: equations of antiquity	16
1. Why we believe in arithmetic: the world's simplest equation	20
2. Resisting a new concept: the discovery of zero	26
3. The square of the hypotenuse: the Pythagorean theorem	30
4. The circle game: the discovery of $\pi$	40
5. From Zeno's paradoxes to the idea of infinity	46
6. A matter of leverage: laws of levers	52
part two: equations in the age of exploration	56
7. The stammerer's secret: Cardano's formula	60
8. Order in the heavens: Kepler's laws of planetary motion	68
9. Writing for eternity: Fermat's Last Theorem	74
10. An unexplored continent: the fundamental theorem of calculus	80
11. Of apples, legends . . . and comets: Newton's laws	90
12. The great explorer: Euler's theorems	96





part three: equations in a promethean age	104
13. The new algebra: Hamilton and quaternions	108
14. Two shooting stars: group theory	114
15. The geometry of whales and ants: non-Euclidean geometry	122
16. In primes we trust: the prime number theorem	128
17. The idea of spectra: Fourier series	134
18. A god's-eye view of light: Maxwell's equations	142
 part four: equations in our own time	 150
19. The photoelectric effect: quanta and relativity	154
20. From a bad cigar to Westminster Abbey: Dirac's formula	164
21. The empire-builder: the Chern-Gauss-Bonnet equation	174
22. A little bit infinite: the Continuum Hypothesis	182
23. Theories of chaos: Lorenz equations	194
24. Taming the tiger: the Black-Scholes equation	204
 conclusion: what of the future?	 214
 acknowledgments	 218
bibliography	219
index	222