

Contents

Introduction

vii

Ancient Mathematics

Foreword	3
Sherlock Holmes in Babylon, <i>R. Creighton Buck</i>	5
Words and Pictures: New Light on Plimpton 322, <i>Eleanor Robson</i>	14
Mathematics, 600 B.C.-600 A.D., <i>Max Dehn</i>	27
Diophantus of Alexandria, <i>J. D. Swift</i>	41
Hypatia of Alexandria, <i>A. W. Richeson</i>	47
Hypatia and Her Mathematics, <i>Michael A. B. Deakin</i>	52
The Evolution of Mathematics in Ancient China, <i>Frank Swetz</i>	60
Liu Hui and the First Golden Age of Chinese Mathematics, <i>Philip D. Straffin, Jr.</i>	69
Number Systems of the North American Indians, <i>W. C. Eells</i>	83
The Number System of the Mayas, <i>A. W. Richeson</i>	94
Before The Conquest, <i>Marcia Ascher</i>	98
Afterword	105

Medieval and Renaissance Mathematics

Foreword	109
The Discovery of the Series Formula for π by Leibniz, Gregory and Nilakantha, <i>Ranjan Roy</i>	111
Ideas of Calculus in Islam and India, <i>Victor J. Katz</i>	122
Was Calculus Invented in India?, <i>David Bressoud</i>	131
An Early Iterative Method for the Determination of $\sin 1^\circ$, <i>Farhad Riahi</i>	138
Leonardo of Pisa and his Liber Quadratorum, <i>R. B. McClenon</i>	143
The Algorists vs. the Abacists: An Ancient Controversy on the Use of Calculators, <i>Barbara E. Reynolds</i>	148
Sidelights on the Cardan-Tartaglia Controversy, <i>Martin A. Nordgaard</i>	153
Reading Bombelli's <i>x</i> -purgated Algebra, <i>Abraham Arcavi and Maxim Bruckheimer</i>	164
The First Work on Mathematics Printed in the New World, <i>David Eugene Smith</i>	169
Afterword	173

The Seventeenth Century

Foreword	177
An Application of Geography to Mathematics: History of the Integral of the Secant, <i>V. Frederick Rickey and Philip M. Tuchinsky</i>	179
Some Historical Notes on the Cycloid, <i>E. A. Whitman</i>	183
Descartes and Problem-Solving, <i>Judith Grabiner</i>	188

René Descartes' Curve-Drawing Devices: Experiments in the Relations Between Mechanical Motion and Symbolic Language, <i>David Dennis</i>	199
Certain Mathematical Achievements of James Gregory, <i>Max Dehn and E. D. Hellinger</i>	208
The Changing Concept of Change: The Derivative from Fermat to Weierstrass, <i>Judith V. Grabiner</i>	218
The Crooked Made Straight: Roberval and Newton on Tangents, <i>Paul R. Wolfson</i>	228
On the Discovery of the Logarithmic Series and Its Development in England up to Cotes, <i>Josef Ehrenfried Hofmann</i>	235
Isaac Newton: Man, Myth, and Mathematics, <i>V. Frederick Rickey</i>	240
Reading the Master: Newton and the Birth of Celestial Mechanics, <i>Bruce Pourciau</i>	261
Newton as an Originator of Polar Coordinates, <i>C. B. Boyer</i>	274
Newton's Method for Resolving Affected Equations, <i>Chris Christensen</i>	279
A Contribution of Leibniz to the History of Complex Numbers, <i>R. B. McClenon</i>	288
Functions of a Curve: Leibniz's Original Notion of Functions and Its Meaning for the Parabola, <i>David Dennis and Jere Confrey</i>	292
Afterword	297

The Eighteenth Century

Foreword	301
Brook Taylor and the Mathematical Theory of Linear Perspective, <i>P. S. Jones</i>	303
Was Newton's Calculus a Dead End? The Continental Influence of Maclaurin's Treatise of Fluxions, <i>Judith Grabiner</i>	310
Discussion of Fluxions: from Berkeley to Woodhouse, <i>Florian Cajori</i>	325
The Bernoullis and the Harmonic Series, <i>William Dunham</i>	332
Leonhard Euler 1707-1783, <i>J. J. Burckhardt</i>	336
The Number e , <i>J. L. Coolidge</i>	346
Euler's Vision of a General Partial Differential Calculus for a Generalized Kind of Function, <i>Jesper Lützen</i>	354
Euler and the Fundamental Theorem of Algebra, <i>William Dunham</i>	361
Euler and Differentials, <i>Anthony P. Ferzola</i>	369
Euler and Quadratic Reciprocity, <i>Harold M. Edwards</i>	375
Afterword	383

Index

About the Editors

385

387