

Contents

Introduction 10

c. 150 Million B.C. Ant Odometer 18

c. 30 Million B.C. Primates Count 20

c. 1 Million B.C. Cicada-Generated Prime
Numbers 22

c. 100,000 B.C. Knots 24

c. 18,000 B.C. Ishango Bone 26

c. 3000 B.C. Quipu 28

c. 3000 B.C. Dice 30

c. 2200 B.C. Magic Squares 32

c. 1800 B.C. Plimpton 322 34

c. 1650 B.C. Rhind Papyrus 36

c. 1300 B.C. Tic Tac Toe 38

c. 600 B.C. Pythagorean Theorem and Triangles 40
548 B.C. Go 42

c. 530 B.C. Pythagoras Finds Mathematical
Brotherhood 44

c. 445 B.C. Zeno's Paradoxes 46

c. 440 B.C. Quadrature of the Lune 48

c. 350 B.C. Platonic Solids 50

c. 350 B.C. Aristotle's *Organon* 52

c. 320 B.C. Aristotle's Wheel Paradox 54
300 B.C. Euclid's *Elements* 56

c. 250 B.C. Archimedes: Sand, Cattle &
Stomachion 58

c. 250 B.C. π 60

c. 240 B.C. Sieve of Eratosthenes 62

c. 240 B.C. Archimedean Semi-Regular
Polyhedra 64

225 B.C. Archimedes' Spiral 66

c. 180 B.C. Cissoid of Diodes 68

c. 150 Ptolemy's *Almagest* 70

250 Diophantus's *Arithmetica* 72

c. 340 Pappus's Hexagon Theorem 74

c. 350 Bakhshali Manuscript 76

415 The Death of Hypatia 78

c. 650 Zero 80

c. 800 Alenín's *Propositiones ad Acuendos
Juvenes* 82

830 Al-Khwarizmi's *Algebra* 84

834 Borromean Kings 86

850 *Ganita Sara Samgraha* 88

c. 850 Thabit Formula for Amicable Numbers 90

C.953 *Chapters in Indian Mathematics* 92

1070 Omar Khayyam's *Treatise* 94

e. 11 50 Al-Samawal's *The Dazzling* 96

c. 1200 Abacus 98

1202 Fibonacci's *Liber Abaci* 100

1256 Wheat on a Chessboard 102

c. 1350 Harmonic Series Diverges 104

c. 1427 Law of Cosines 106

1478 7 *reviso Arithmetic* 108

c. 1500 Discovery of Series Formula for π 110

1509 Golden Ratio 112

1518 *Polygraphiae Libri Sex* 114

1537 Loxodrome 116

1545 Cardano's *Ars Magna* 118

1556 *Sumario Compendioso* 120

1569 Mercator Projection 122

1572 Imaginary Numbers 124

1611 Kepler Conjecture 126

1614 Logarithms 128

- 1621 Slide Rule **130**
- 1636 Fermat's Spiral **132**
- 1637 Fermat's Last Theorem **134**
- 1637 Descartes' *L a Geometrie* **136**
- 1637 Cardioid **138**
- 1638 Logarithmic Spiral **140**
- 1639 Projective Geometry **142**
- 1641 Torricelli's Trumpet **144**
- 1654 Pascal's Triangle **146**
- 1657 The Length of Neile's Semicubical Parabola **148**
- 1659 Viviani's Theorem **150**
- c. 1665 Discovery of Calculus **152**
- 1669 Newton's Method **154**
- 1673 Tautochrone Problem **156**
- 1674 Astroid **158**
- 1696 L'Hôpital's *Analysis of the Infinitely Small* **160**
- 1702 Rope Around the Earth Puzzle **162**
- 1713 Law of Large Numbers **164**
- 1727 Euler's Number, *e* **166**
- 1730 Stirling's Formula **168**
- 1733 Normal Distribution Curve **170**
- 1735 Euler-Mascheroni Constant **172**
- 1736 Königsberg Bridges **174**
- 1738 St. Petersburg Paradox **176**
- 1742 Goldbach Conjecture **178**
- 1748 Agnesi's *Istituzioni Analitiche* **180**
- 1751 Euler's Formula for Polyhedra **182**
- 1751 Euler's Polygon Division Problem **184**
- 1759 Knight's Tours **186**
- 1761 Bayes' Theorem **188**
- 1769 Franklin Magic Square **190**
- 1774 Minimal Surface **192**
- 1777 Buffon's Needle **194**
- 1779 Thirty-Six Officers Problem **196**
- c. 1789 Sangaku Geometry **198**
- 1795 Least Squares **200**
- 1796 Constructing a Regular Heptadecagon **202**
- 1797 Fundamental Theorem of Algebra **204**
- 1801 Gauss's *Disquisitiones Arithmeticae* **206**
- 1801 Three-Armed Protractor **208**
- 1807 Fourier Series **210**
- 1812 Laplace's *Theorie Analytique des Probabilités* **212**
- 1816 Prince Ruperts Problem **214**
- 1817 Bessel Functions **216**
- 1822 Babbage Mechanical Computer **218**
- 1823 Cauchy's *Le Calcul Infinitesimal* **220**
- 1827 Barycentric Calculus **222**
- 1829 Non-Euclidean Geometry **224**
- 1831 Möbius Function **226**
- 1832 Group Theory **228**
- 1834 Pigeonhole Principle **230**
- 1843 Quaternions **232**
- 1844 Transcendental Numbers **234**
- 1844 Catalan Conjecture **236**
- 1850 The Matrices of Sylvester **238**
- 1852 Four-Color Theorem **240**
- 1854 Boolean Algebra **242**
- 1857 Icosian Game **244**
- 1857 Harmonograph **246**
- 1858 The Möbius Strip **248**
- 1858 Holditch's Theorem **250**
- 1859 Riemann Hypothesis **252**
- 1868 Beltrami's Pseudosphere **254**
- 1872 Weierstrass Function **256**
- 1872 Gross *Theorie du Baguénodier* **258**

1874 The Doctorate of Kovalevskaya 260	1913 Infinite Monkey Theorem 328
1874 Fifteen Puzzle 262	1916 Bieberbach Conjecture 330
1874 Cantor's Transfinite Numbers 264	1916 Johnson's Theorem 332
1875 Reuleaux Triangle 266	1918 Hausdorff Dimension 334
1876 Harmonic Analyzer 268	1919 Brun's Constant 336
1879 Ritty Model I Cash Register 270	c. 1920 Googol 338
1880 Venn Diagrams 272	1920 Antoine's Necklace 340
1881 Benford's Law 274	1921 Noether's Idealtheorie 342
1882 Klein Bottle 276	1921 Lost in Hyperspace 344
1883 Tower of Hanoi 278	1922 Geodesic Dome 346
1884 <i>Flatland</i> 280	1924 Alexander's Horned Sphere 348
1888 Tesseract 282	1924 Banach-Tarski Paradox 350
1889 Peano Axioms 284	1925 Squaring a Rectangle 352
1890 Peano Curve 286	1925 Hilbert's Grand Hotel 354
1891 Wallpaper Groups 288	1926 Menger Sponge 356
1893 Sylvester's Line Problem 290	1927 Differential Analyzer 358
1896 Proof of the Prime Number Theorem 292	1928 Ramsey Theon 360
1899 Pick's Theorem 294	1931 Gödel's Theorem 362
1899 Morley's Trisector Theorem 296	1933 Champernowne's Number 364
1900 Hilbert's 23 Problems 298	1935 Bourbaki: Secret Society 366
1900 Chi-Square 300	1936 Fields Medal 368
1901 Bov's Surface 302	1936 Turing Machines 370
1901 Barber Paradox 304	1936 Voderberg Tilings 372
1901 Jung's Theorem 306	1937 Collatz Conjecture 374
1904 Poincare Conjecture 308	1938 Ford Circles 376
1904 Koch Snowflake 310	1938 The Rise of Randomizing Machines 378
1904 Zermelo's Axiom of Choice 312	1939 Birthday Paradox 380
1905 Jordan Curve Theorem 314	c.1940 Polygon Circumscribing 382
1906 Thue-Morse Sequence 316	1942 Hex 384
1909 Brouwer Fixed-Point Theorem 318	1945 Pig Game Strateg) 386
1909 Normal Number 320	1946 ENIAC 388
1909 Boole's <i>Philosophy and Fun of Algebra</i> 322	1946 Von Neumann's Middle-Square Randomizer 390
1910-1913 <i>Principia Mathematica</i> 324	1947 Gray Code 392
1912 Hairy Ball Theorem 326	

1948 Information Theory 394	1974 Perko Knots 458
1948 Curta Calculator 396	1975 Fractals 460
1949 Császár Polyhedron 398	1975 Feigenbaum Constant 462
1950 Nash Equilibrium 400	1977 Public-Key Cryptography 464
c. 1950 Coastline Paradox 402	1977 Szilassi Polyhedron 466
1950 Prisoner's Dilemma 404	1979 Ikeda Attractor 468
1952 Cellular Automata 406	1979 Spidrons 470
1957 Martin Gardner's Mathematical Recreations 408	1980 Mandelbrot Set 472
1958 Gilbreath's Conjecture 410	1981 Monster Group 474
1958 Timing a Sphere Inside Out 412	1982 Ball Triangle Picking 476
1958 Platonic Billiards 414	1984 Jones Polynomial 478
1959 Outer Billiards 416	1985 Weeks Manifold 480
1960 Newcomb's Paradox 418	1985 Andrica's Conjecture 482
1960 Sierpiński Numbers 420	1985 The ABC Conjecture 484
1965 Chaos and the Butterfly Effect 422	1986 Audioactive Sequence 486
1963 Ulam Spiral 424	1988 Mathematica 488
1963 Continuum Hypothesis Undecidability' 426	1988 Murphy's Law and Knots 490
c. 1965 Superegg 428	1989 Butterfly Curve 492
1965 Fuzzy Logic 430	1996 The On-Line Encyclopedia of Integer Sequences 494
1966 Instant Insanity 432	1999 Eternity Puzzle 496
1967 Langlands Program 434	1999 Perfect Magic Tesseract 498
1967 Sprouts 436	1999 Parrondo's Paradox 500
1968 Catastrophe Theory 438	1999 Solving of the Holyhedron 502
1969 Tokarsky's Unilluminable Room 440	2001 Bed Sheet Problem 504
1970 Donald Knuth and Mastermind 442	2002 Solving the Game of Awari 506
1971 Erdős and Extreme Collaboration 444	2002 Tetris Is NP-Complete 508
1972 HP-35: First Scientific Pocket Calculator 446	2005 <i>NUMB3RS</i> 510
1973 Penrose Tiles 448	2007 Checkers Is Solved 512
1973 Art Gallery Theorem 450	2007 The Quest for Lie Group Eg 514
1974 Rubik's Cube 452	2007 Mathematical Universe Hypothesis 516
1974 Chaitin's Omega 454	Notes and Further Reading 518
1974 Surreal Numbers 456	Index 526
	Photo Credits 528