

31^{f st}
EDITION

CRC
STANDARD .
MATHEMATICAL
TABLES AND
FORMULAE

Table of Contents

Chapter 1

Analysis	1
• 1.1 Constants	3
L2 Special numbers	10
1.3 Series and products	31
1.4 Fourier series	48
1.5 Complex analysis	53
1.6 Interval analysis	65
1.7 Real analysis	66
1.8 Generalized functions	76

Chapter 2

Algebra	79
2.1 Proofs without words	81
2.2 Elementary algebra	83
2.3 Polynomials	89
2.4 Number theory	93
2.5 Vector algebra	131
2.6 Linear and matrix algebra	137
; 2.7 Abstract algebra	160

Chapter 3

Discrete Mathematics	197
3.1 Symbolic logic	199
3.2 Set theory	202
3.3 Combinatorics	206
3.4 Graphs	219
3.5 Combinatorial design theory	241
3.6 Communication theory	253
• 3.7 Difference equations	265
3.8 Discrete dynamical systems and chaos	272
J 3.9 Game theory	274
3.10 Operations research	280

Chapter 4

Geometry	297
4.1 Coordinate systems in the plane	299
4.2 Plane symmetries or isometries	305
4.3 Other transformations of the plane	312
4.4 Lines	314

4.5	Polygons	317
4.6	Conies	325
4.7	Special plane curves	336
4.8	Coordinate systems in space	345
4.9	Space symmetries or isometries	348
4.10	Other transformations of space	352
4.11	Direction angles and direction cosines	353
4.12	Planes	354
4.13	Lines in space	355
4.14	Polyhedra	357
4.15	Cylinders	361
4.16	Cones	361
4.17	Surfaces of revolution: the torus	363
4.18	Quadrics	364
4.19	Spherical geometry & trigonometry	368
4.20	Differential geometry	373
4.21	Angle conversion	381
4.22	Knots up to eight crossings	382
Chapter 5		
Continuous Mathematics		383
5.1	Differential calculus	385
5.2	Differential forms	395
5.3	Integration	398
5.4	Table of indefinite integrals	412
5.5	Table of definite integrals	448
5.6	Ordinary differential equations	456
5.7	Partial differential equations	468
5.8	Eigenvalues	477
5.9	Integral equations	478
5.10	Tensor analysis	482
5.11	Orthogonal coordinate systems	492
5.12	Control theory	497
Chapter 6		
Special Functions		499
6.1	Trigonometric or circular functions	503
6.2	Circular functions and planar triangles	512
6.3	Inverse circular functions	518
6.4	Ceiling and floor functions	520
6.5	Exponential function	520
6.6	Logarithmic functions	522
6.7	Hyperbolic functions	523
6.8	Inverse hyperbolic functions	527
6.9	Gudermannian function	530
6.10	Orthogonal polynomials	532

6.11	Gamma function	540
• 6.12	Beta function	544
6.13	Error functions	545
6.14	Fresnel integrals	547
6.15	Sine, cosine, and exponential integrals	549
.. 6.16	Poly logarithms	551
.. 6.17	Hypergeometric functions	552
6.18	Legendre functions	554
6.19	Bessel functions	559
6.20	Elliptic integrals	568
6.21	Jacobian elliptic functions	572
6.22	Clebsch-Gordan coefficients	574
6.23	Integral transforms: Preliminaries	576
6.24	Fourier transform	576
, 6.25	Discrete Fourier transform (DFT)	582
6.26	Fast Fourier transform (FFT)	584
6.27	Multidimensional Fourier transform	585
6.28	Laplace transform	585
'6.29	Hankel transform	589
6.30	Hartley transform	591
6.31	Hilbert transform	591
6.32	Z-Transform	594
6.33	Tables of transforms	599

Chapter 7

Probability and Statistics	615
--------------------------------------	-----

7.1	Probability theory	617
7.2	Classical probability problems	627
7.3	Probability distributions	630
7.4	Queuing theory	637
7.5	Markov chains	640
7.6	Random number generation	644
7.7	Control charts and reliability	650
7.8	Risk analysis and decision rules	656
7.9	Statistics	658
7.10	Confidence intervals	666
7.11	Tests of hypotheses	669
7.12	Linear regression	682
7.13	Analysis of variance (ANOVA)	686
7.14	Probability tables	695
7.15	Signal processing	718

Chapter 8

Scientific Computing	727
--------------------------------	-----

8.1	Basic numerical analysis	728
8.2	Numerical linear algebra	740

8.3	Numerical integration and differentiation	750
8.4	Programming techniques	777
<i>Chapter 9</i>		
Financial Analysis.		779
9.1	Financial formulae	779
9.2	Financial tables *	783
<i>Chapter 10</i>		[^]
Miscellaneous.		791
10.1	Units	792
10.2	Interpretations of powers of 10	798
10.3	Calendar computations.	799
10.4	AMS classification scheme.	801
10.5	Fields medals.	802
10.6	Greek alphabet	803
10.7	Computer languages.	803
10.8	Professional mathematical organizations.	804
10.9	Electronic mathematical resources.	807
10.10	Biographies of mathematicians.	810
List of references.		817
List of	figures.	821
List of notation.		823
Index.		835