

INDEX

- Abel's lemma, 246
- Abel's theorem, 245
- absolute convergence
 - of series, 61
 - of power series, 145
- absolute value, 10
- affine set, 173
- affine function, 177
- analytic function, 146
- angle, 166
- anti-derivative, 125
- arccosine function, 155
- Archimedian property, 20
- arcsine function, 155
- arctangent function, 155
- area, 13, 120
- arithmetic mean, 8

- backwards induction, 23, 25
- beta function, 160, 161
- binomial theorem, 25, 107, 150
- Bolzano–Weierstrass theorem, 47, 182
- bounded
 - above, 13
 - below, 13
 - function, 71
 - set, 13
- bounds, 13
- Brouwer's fixed point theorem, 90

- Cauchy mean value theorem, 105
- Cauchy–Schwarz inequality, 7, 13, 167
- Cauchy sequence, 51
- chain rule, 213
- closed interval, 17, 19
- cluster point, 53
- column vector, 176
- combination theorem
 - for functions, 80
 - for sequences, 30
- compact interval, 17
- comparison test, 59

- component, 163
- component function, 199
- composite function, 69
- composition, 69
- concave functions, 115
- conditional convergence, 61
- continuity, 85 *et seq.*, 184
 - at a point, 78
 - on an interval, 85
- continuity property, 87
- continuous, 78
 - on left, 78
 - on right, 78
- continuum property, 13 *et seq.*
- contour, 191
- convergence, 191
 - of functions, 75
 - of sequences, 27
 - of series, 54
- convex functions, 115
- co-ordinate, 163
- cosine function, 152
- cosine rule, 165

- decreasing
 - function, 109
 - sequence, 34
- degree
 - of polynomial, 25, 67
- derivative, 92, 96, 203
- differentiable, 92, 199
- differential, 94, 96, 231 *et seq.*
- differentiation, 92 *et seq.*, 190 *et seq.*
- direction, 169
- directional cosines, 174
- directional derivative, 190
- distance
 - between points, 11, 168
 - between point and set, 19
- divergent
 - functions, 83
 - sequences, 38
 - series, 55

360 Index

- domain of function, 65
- eigenvalue, 223
- eigenvector, 224
- element of set, 1
- empty set, 1
- Euler–Maclaurin formula, 135
- Euler’s constant, 140
- exponential function, 141

- flat, 173
- function, 65 *et seq.*

- gamma function, 158
- geometric mean, 23
- gradient, 210
- graph, 65, 174

- harmonic mean, 8
- L’Hôpital’s rule, 105
- hyperplane, 171

- identity matrix, 212
- image
 - of point, 65
 - of set, 66
- improper integral, 133
- increasing
 - function, 109
 - sequence, 33
- induction, 22
- inequalities, 3
- infimum, 15, 72
- infinitesimal, 95
- inner product, 165
- integer, 2
- integral, 121
- integral test, 136
- integration, 120 *et seq.*
 - by parts, 130
- intermediate value theorem, 88
- interval, 16
 - of convergence, 145
- inverse function, 69, 111
- irrational number, 2, 9

- Jacobian, 215

- least squares analysis, 218
- Leibniz’s rule, 98
- length, 164
- limit along a path, 187

- limit
 - of function, 75, 183
 - of sequence, 27, 181; inferior, 49; superior, 49
- limit point of set, 53
- line, 169
- linear function, 176
- local maximum, 101, 196
- local minimum, 101, 196
- logarithm function, 138
- lower bound, 14

- matrix, 175
- maximum, 15, 72
- mean value theorem, 103, 221
- minimum, 15, 72
- Minkowski’s inequality, 8, 10
- modulus, 10
- monotone
 - function, 109
 - sequence, 34

- natural logarithm, 3, 139
- natural number, 2, 20
- negative definite, 224
- Newton–Raphson process, 118
- norm, 164
- normal, 166
- n th root test, 60, 145, 169

- open interval, 17, 19
- orthogonal, 166
- oscillating sequence, 39

- parallelogram law, 164
- parametric equation, 170
- partial derivative, 192
- partial sum, 54
- partition, 121
- path, 186
- periodicity, 154
- perpendicular, 166
- point of accumulation, 53
- polynomial, 25, 67
- positive definite, 224
- powers, 142
- power series, 144 *et seq.*
- principal minor, 225
- primitive, 125
- principle of induction, 22
- Pythagoras’ theorem, 166

- quadratic equation, 6
- quadratic form, 224

- radius of convergence, 145
- range
 - of function, 66
 - of sequence, 27
- rational function, 68, 185
- rational number, 2
- ratio test, 60, 145, 165
- real number, 2
- Riemann integral, 129
- Rolle's theorem, 103
- roots, 6, 113
- row vector, 176

- saddle point, 198, 224
- sandwich theorem
 - for functions, 81
 - for sequences, 31
- scalar multiplication, 163
- scalar product, 165
- second derivative, 220
- sequence, 27
- series, 54
- set, 1
- sine function, 152
- slope, 92
- stationary point, 102, 217
- Stirling's formula, 157, 161
- strictly increasing or decreasing function, 109
 - sequence, 34
- subset, 1
- sum of series, 54
- supremum, 15, 71
- symmetric matrix, 332

- tail of series, 59
- tangent, 155
- tangent flat, 200
- Taylor polynomial, 98, 222
- Taylor series, 146
- Taylor's theorem, 106
- tends to a limit, 27, 75
- term of sequence, 27
- transcendental number, 10
- transpose, 180
- triangle inequality, 10, 167
- trigonometric function, 151

- unbounded
 - set, 14
 - function, 72
- uniform convergence, 148
- unit vector, 169
- upper bound, 13

- vector, 163
- vector addition, 163
- vector function, 174