

Index

A

absolute extremum, 105
algebraic precedence, xii
alternating harmonic series, 249
antiderivative, 145
arccosine, 90
arcsine, 89
asymptote, 10, 102

B

bell curve, 214
bounded function, 40

C

Cauchy Principal Value, 207
center of mass, 202
centroid, 203
chain rule, 56
chord, 20
circle
 area, xiii
 circumference, xiii
 equation of, xiii, 7, 8
 unit, 7
completing the square, xii
composition of functions, 13
concave down, 101

concave up, 100
cone
 lateral area, xiii
 surface area, xiii
 volume, xiii
continuous, 42, 51
convergent sequence, 235
convergent series, 241
cosines
 law of, xiii
critical value, 94
cumulative distribution function, 213
cylinder
 lateral area, xiii
 surface area, xiii
 volume, xiii

D

definite integral, 149
dependent variable, 10
derivative, 22
 dot notation, 119
 Leibniz notation, 36
difference quotient, 20
differentiable, 42
differential, 132
differential equation, 227
 first order, 228
 separable, 228

304 Index

discrete probability, 210
divergence test, 243
divergent sequence, 235
divergent series, 241
domain, 9
dot notation, 119

E

ellipse
 equation of, xiii
ellipsoid, 227
escape velocity, 208
even function, 215
expected value, 210
exponential distribution, 214
exponential function, 72
Extreme Value Theorem, 107

F

Fermat's Theorem, 94
floor, 51
frustum, 223
function, 8
 bounded, 40
 differentiable, 42
 even, 215
 implicit, 84
 linear, 8
 rational, 170
 unbounded, 41
function composition, 13
Fundamental Theorem of Algebra, 97
Fundamental Theorem of Calculus, 143

G

Gabriel's horn, 209, 227
geometric series, 241
global extremum, 105
greatest integer, 51, 97

H

harmonic series, 244
 alternating, 249
Hooke's Law, 198

I

implicit differentiation, 84

implicit function, 84
improper integral, 206
 convergent, 206
 diverges, 206
indefinite integral, 149
independent variable, 10
inflection point, 101
initial value problem
 first order, 228
integral
 improper, 206
 of $\sec x$, 164
 of $\sec^3 x$, 165
 properties of, 153
integral sign, 145
integral test, 247
integration
 by parts, 167
Intermediate Value Theorem, 42
interval of convergence, 260
inverse function, 72
inverse sine, 89

K

kinetic energy, 208

L

L'Hôpital's Rule, 81
lateral area, 117
law of cosines, xiii
law of sines, xiii
Leibniz notation, 36
limit, 29
limit at infinity, 81
limit of a sequence, 235
linear approximation, 131
linearity of the derivative, 48
local extremum, 93
local maximum, 93
local minimum, 93
logarithm, 72
logarithmic function, 72
logistic equation, 231

M

Maclaurin series, 264
mean, 215
Mean Value Theorem, 135

median, 214
 mode, 215
 moment, 201

N

Newton, 197
 Newton's law of cooling, 227
 normal distribution, 219

O

one sided limit, 34
 optimization, 105

P

p-series, 247
 physicists, 119
 point-slope formula, xiii
 power function, 45
 power rule, 45, 79, 87
 precedence
 of algebraic operations, xii
 probability density function, 211
 probability distribution, 213
 product rule, 50, 51
 generalized, 53
 properties of integrals, 153

Q

quadratic formula, xii
 quotient rule, 53

R

radian measure, 63
 radius of convergence, 260
 random variable, 211
 rational function, 56, 170
 related rates, 118
 Rolle's Theorem, 134

S

separation of variables, 229
 sequence, 234
 bounded, 239
 bounded above, 239
 bounded below, 239

convergent, 235
 decreasing, 238
 divergent, 235
 increasing, 238
 monotonic, 238
 non-decreasing, 238
 non-increasing, 238
 of partial sums, 241
 series, 234
 p-series, 247
 absolute convergence, 255
 alternating harmonic, 249
 conditional convergence, 255
 convergent, 241
 divergent, 241
 geometric, 241
 harmonic, 244
 integral test, 247
 interval of convergence, 260
 Maclaurin, 264
 radius of convergence, 260
 Taylor, 266
 sines
 law of, xiii
 sphere
 surface area, xiii
 volume, xiii
 squeeze theorem, 67
 standard deviation, 216
 standard normal distribution, 214
 standard normal probability density
 function, 214
 subtend, 64
 sum rule, 49

T

tangent line, 20
 Taylor series, 266
 Toricelli's trumpet, 209, 227
 torque, 200
 torus, 227
 transcendental function, 63
 triangle inequality, 31
 trigonometric identities, xiii

U

unbounded function, 41
 uniform distribution, 213
 uniform probability density function, 213
 unit circle, 7

W

witch of Agnesi, 56
 work, 195