## INDEX

(The numbers refer to pages)
$a^{x}, a^{z}, 4,45,162$
Abel's theorem on uniformity, 438
Absolute convergence, of integrals, 357, 369 ; of series, 422,441
Absolute value, of complex numbers, 154 ; of reals, 35 ; sum of, 36
Acceleration, in a line, 13 ; in general, 174 ; problems on, 186
Addition, of complex numbers, 154 ; of operators, 151 ; of vectors, 154,163
Adjoint equation, 240
Algebra, fundamental theorem of, 159, 306,482 ; laws of, 153
Alternating series, 39, 420, 452
$\mathrm{am}=\sin ^{-1} \mathrm{sn}, 507$
Ampère's Law, 350
Amplitude, function, 507 ; of complex numbers, 154; of harmonic motion, 188
Analytic continuation, 444,543
Analytic function, 304, 435. See Functions of a complex variable
Angle, as a line integral, 297, 308 ; at critical points, 491 ; between curves, 9 ; in space, 81 ; of a complex number, 154 ; solid, 347
Angular velocity, 178, 346
Approximate formulas, 60, 77, 101, 383
Approximations, 59, 195; successive, 198. See Computation
Arc, differential of, 78, 80, 131; of ellipse, 77, 514; of hyperbola, 516. See Length
Area, $8,10,25,67,77$, as a line integral, 288 ; by double integration, 324, 329 : directed, 167 ; element of, $80,131,175$, 340,342 ; general idea, 311 ; of a surface, 339
Areal velocity, 175
Argument of a complex number, 154
Associative law, of addition, 153, 163 ; of multiplication, 150, 153
Asymptotic expansion, 390, 397, 456
Asymptotic expression for $n!, 383$
Asymptotic lines and directions, 144
Asymptotic series, 390
Attraction, 31, 68, 308, 332, 348, 547; Law of Nature, 31, 307 ; motion under, 190, 264: See Central Force and l'otential

Average value, 333 ; of functions, 333 ; of a harmonic function, 531 ; over a surface, 340
Axes, right- or left-handed, 84, 167
Axiom of continuity, 34
B. See Bernoulli numbers, Beta function

Bernoulli's equation, 205, 210
Bernoulli's numbers, 448, 456
Bernoulli's polynomials, 451
Bessel's equation, 248
Bessel's functions, 248, 393
Beta function, 378
Binomial theorem, finite remainder in, 60 ; infinite series, 423,425
Binormal, 83
Boundary of a region, $87,308,311$
Boundary values, 304,541
Brachistochrone, 404
Branch of a function, of one variable, 40 ; of two variables, 90 ; of a complex variable, 492
Branch point, 492
$C_{n}$. See Cylinder functions
Calculation. See Computation, Evaluation, etc.
Calculus of variations, 400-418
Cartesian expression of vectors, $\mathbf{1 6 7}$
Catenary, 78, 190 ; revolved, 404, 408
Cauchy's Formula, 30, 49, 61
Cauchy's Integral, 304, 477
Cauchy`s Integral test, 421, 427
Calistic, 142
Center, instantancous, 74, 178; of inversion, 538
Center of gravity or mass, motion of the, 176 ; of areas or laminas, 317,324 ; of points or masses, 168 ; of volumes, 328
Central force, 175,264
Centrode, fixed or moving, it
Chain, equilibrium of, 185, 190, 409; motion of, 415
Change of variable, in derivatives, 12 , $14,67,98,103,106$; in differential equations, $204,235,245$; in integrals, $16,21,54,65,328,330$
Characteristic curves, 140, 267
Characteristic strip, 279

