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## Ap calculus bc limits and continuity test pdf pdf download

Basic commutative algebra and classical algebraic geometry. Introduction to Programming for Data Science. Prerequisite: MATH 233B MATH 234A, MATH 298C. Prerequisite: MATH 205A Concurrent with MATH H140B. Mathematics of Cryptography. Prerequisite: MATH H140B. Mathematical and Computational Biology. Mathematical Modeling in Physics II. Riemannian manifolds, connections, curvature and torsion. Restriction: School of Physical Sciences students have first consideration for enrollment. School of Engineering students have first consideration for enrollment. Includes topics from number theory, probability, and abstract algebra. Provides practical experience to complement the theory developed in Mathematics 105A. Mathematical Modeling. MATH 134B. Satisfactory completion of the Lower-Division Writing requirement. Quantitative Economics Majors have first consideration for enrollment. Prerequisite: (MATH 2B or MATH 5B or MATH 7B or AP Calculus BC) and (MATH 3A or MATH H3A) and (MATH 13 or (ICS 6B and ICS 6D)). Combinatorics . Diophantine equations. Analysis of random processes using computer simulations. Introduction to abstract linear algebra, including bases, linear transformation, eigenvectors, canonical forms, inner products, and symmetric operators. Analytic Function Theory. Introduction to Partial Differential Equations and Applications III. Restriction: School of Physical Sciences students only. MATH 105B. Analytic number theory, character sums, finite fields, discrete logarithm, computational complexity, Number Theory II. Classification of PDEs, separation of variables and series expansions, special functions, eigenvalue problems. Honors Introduction to Linear Algebra. Prerequisite: MATH 121A. Prerequisite: MATH 218A MATH 218C. Algebraic integers, prime ideals, class groups, Dirichlet unit theorem, localization, completion, Chebotarev density theorem, L-functions, Gauss sums, diophantine equations, zeta functions over finite fields. Prerequisite: MATH 218B MATH 220A. Prerequisite: MATH 227A Same as CS 285. Introduction to Programming for Numerical Analysis. Riemannian manifolds, connections, curvature, and torsion. General derivatives; call/put options; hedging and investment strategies; spreads and collars; risk management; forwards and futures; bonds. MATH 120A with a grade of C- or better Restriction: Mathematics Majors have first consideration for enrollment. Topics include basic logic, set theory, equivalence relations, and various proof techniques such as direct, induction, contradiction, contrapositive, and exhaustion. Polar coordinates. Studies in the Learning and Teaching of Secondary Mathematics. Topics vary from year to year. Line and surface integrals, divergence and curl, theorems of Greens, Gauss, and Stokes. Prerequisite: MATH 280A MATH 280C. (II and VB ). Prerequisite: MATH 210C and MATH 220C MATH 260B. Combinatorial probability, conditional probabilities, independence, discrete and continuous random variables, expectation and variance, common probability distributions. Prerequisite: MATH 2B or MATH 5B or MATH 7B or (AP Calculus BC and (MATH H3A or MATH 3A)). Implicit and inverse function theorems. Provides fundamental materials in algebraic topology: fundamental group and covering space, homology and cohomology theory, and homotopy group. Honors Introduction to Graduate Analysis I. MATH 140B. Partial Differential Equations. Prerequisite: Recommended: MATH 2A and MATH 2B and MATH 3A, or equivalent. Studies in selected areas of mathematical logic, a continuation of MATH 280A-MATH 280B-MATH 280C. Prerequisite: MATH 130A or STAT 120A Overlaps with MATH 133C. Prerequisite: MATH 210C Overlaps with STAT 270. Prerequisite: MATH 140B MATH H140A. Riemann zeta function, Dirichlet L-functions, prime number theorem, zeta functions over finite fields, sieve methods, zeta functions of algebraic curves, algebraic coding theory, L-Functions over number fields, L-Functions of modular forms, Eisenstein series. Honors Multivariable Calculus I. Construction of the real number system; topology of the real line; concepts of continuity, differential, and integral calculus; sequences and series of functions, equicontinuity, metric spaces, multivariable differential, and integral calculus; implicit functions, curves and surfaces. MATH 205A. Divisibility, prime numbers, factorization. Students will be assigned individual topics for term papers. Prerequisite: Recommended: MATH 140C and MATH 121B, or equivalent. Multivariable Calculus II. AP Calculus BC with a minimum score of 4 Overlaps with MATH H2D. Prerequisite: MATH 112B MATH 113A. MATH 141. Prerequisite: MATH 290A MATH 290C. Prerequisite: MATH 225A Restriction: Graduate students only. MATH 120B. MATH 210B. Prerequisite: MATH 205B Concurrent with MATH H140C. Problem Solving Seminar. Topics in Probability. Grading Option: Satisfactory/unsatisfactory only. Seminars organized for detailed discussion of research problems of current interest in the Department. AP Calculus BC with a minimum score of 5 Overlaps with MATH 3A, ICS 6N. Calculus for Life Sciences I. Restriction: Mathematics Majors only. MATH 290B. Basics of R Programming. Prerequisite: MATH 3D and MATH 40A MATH 11B. Supervised Reading and Research. Introduction to the modern theory of dynamical systems including contraction mapping principle, fractals and chaos, conservative systems, Kepler problem, billiard models, expanding maps, Smale's horseshoe, topological entropy. Submanifolds, mean curvature, Gauss curvature equation. Introduction to Abstract Algebra: Rings and Fields. Prerequisite: MATH 13 or (ICS 6B and ICS 6D). MATH 298B. MATH 210A. (Vb) MATH 8. AP Calculus BC with a minimum score of 4 MATH 173B. Fourier and Petrov-Galerkin methods; mesh generation. Processes with independent increments, Wiener and Gaussian processes, function space integrals, stationary processes, Markov processes. Limited to Teaching Assistants. Introduction to Differential Geometry I. AP Calculus BC with a minimum score of 4 MATH 113B. Algebraic varieties, morphisms, rational maps, blow ups. Prerequisite: MATH 260B MATH 270A. MATH 121A with a grade of A or better Restriction: Mathematics Honors students only. Prerequisite: MATH 240A MATH 240C. MATH 249. (Vb) MATH 2E. AP Calculus BC with a minimum score of 4 MATH 115. Introduction to groups, rings, and fields, including examples of groups, group actions, Sylow theorems, modules over principal ideal domains, polynomials, and Galois groups. History of Mathematics. Introduction to derivatives, calculation of derivatives of algebraic and trigonometric functions; applications including curve sketching, related rates, and optimization. Honors Introduction to Graduate Algebra I. Prerequisite: MATH 270A MATH 270C. Recommended: MATH 112B and MATH 112C or equivalent. Studies in selected areas of differential geometry. MATH 130A. Honors Introduction to Graduate Analysis II. Prerequisite: MATH 298A Grading Option: Satisfactory/unsatisfactory only. MATH 399. MATH H120B. Multiple scales and WKB. Weekly colloquia on topics of current interest in mathematics. MATH 274. Basic properties of rings; ideals, quotient rings; polynomial and matrix rings. Prerequisite: MATH 230C MATH 232B. Repeatability: May be repeated for credit unlimited times. (Vb) MATH 3D. MATH 140A with a grade of A or better Concurrent with MATH 205A. MATH 297. Prerequisite: MATH 295B MATH 296. Numerical Analysis II. Topics in Analysis, focus on algorithms in data science using Python and R. Corequisite: MATH 105A MATH 105LB. Topics in Partial Differential Equations. Mathematics of Financial Derivatives. MATH 5B with a grade of A or better. Prerequisite: (MATH 3A or MATH H3A) and MATH 13 and (MATH 120A or MATH 121A). MATH 290A. MATH 121A with a grade of C or better. Students taking the course in fall will prepare for and take the Putnam examination in December. (Vb) MATH 2D. Honors Introduction to Graduate Algebra III. MATH 184L. Introduction to formal definition and rigorous proof writing in mathematics. MATH 2B with a grade of A or better. MATH 5A. Introduction to Abstract Algebra: Groups. Special emphasis on students doing proofs. MATH 162A with a grade of C- or better MATH 173A. Mathematics Majors have first consideration for enrollment. Prerequisite: MATH 110A. Theory and techniques for linear and nonlinear partial differential equations. Corequisite: MATH 105LB Prerequisite: MATH 105A MATH 105LA. Single-Variable Calculus II. Supervised reading and research with Mathematics faculty. Mathematics of public key cryptography: encryption and signature schemes; RSA; factoring; primality testing; discrete log based cryptosystems, elliptic and hyperelliptic curve cryptography and additional topics as determined by the instructor. Theory of determinants. AP Calculus BC with a minimum score of 3 MATH 9. Explorations of applications and connections in topics in algebra, geometry, calculus, and statistics for future secondary math educators. The mathematics which is covered includes topics from number theory, probability, and abstract algebra. Studies in selected areas of differential geometry, a continuation of MATH 240A-MATH 240B-MATH 240C. Mathematical Logic. MATH 121A with a grade of C or better Restriction: Mathematics Majors have first consideration for enrollment. Prerequisite: MATH 220C and MATH 230C MATH 239B. MATH 13. Prerequisite: Recommended: MATH 150. Prerequisite: MATH 239B MATH 240A. Prerequisite: Recommended: MATH 270C. Prerequisite or corequisite: (MATH 2D or MATH H2D) and (MATH 3A or MATH H3A) and MATH 9 Restriction: Mathematics Majors have first consideration for enrollment. Green functions and integral representations, method of characteristics. MATH H2E with a grade of A or better. Canonical forms; inner products; similarity of matrices. School of Info & Computer Sci students have first consideration for enrollment. 1-4 Units. Galois theory. Prerequisite: MATH 180A Restriction: Mathematics Majors have first consideration for enrollment. Exponential, logarithmic, and trigonometric functions. Analytic Methods in Arithmetic Geometry. MATH 227B. Supervised reading. Prerequisite: (MATH 2B or MATH 5B or MATH 7B or AP Calculus BC) and MATH 13. Introduction to Topology. MATH 280B. MATH 170B. Repeatability: May be taken for credit 2 times. Prerequisite: (MATH 3A or MATH H3A) and (MATH 2D or MATH H2D) Restriction: School of Physical Sciences students have first consideration for enrollment. Special emphasis on doing proofs. Prerequisite: MATH 3D and MATH 140A MATH 120A. Mathematical Modeling in Biology I. Prerequisite: MATH 230A MATH 230C. Seminar . Restriction: Business Economics Majors have first consideration for enrollment. Introduction to the theory and practice of numerical computation with an emphasis on solving equations. Prerequisite: MATH 282A MATH 282C. Calculus for Life Sciences II. MATH 2E with a grade of A or better. Prerequisite: MATH H140A. MATH 1B with a grade of C or better. Prerequisite or corequisite: MATH 2A or MATH 5A or MATH 7A or AP Calculus AB or AP Calculus BC. MATH 195W. O-minimality. Prerequisite: Recommended: MATH 120B and MATH 141, or equivalent. Honors Multivariable Calculus II. Differential and integral calculus of real-valued functions of several real variables, including applications. Hodge theory applications to geometry and topology. Limit distributions for sums of independent random variables. Overview of interest theory, time value of money, annuities/cash flows with payments that are not contingent, loans, sinking funds, bonds, general cash flow and portfolios, immunization, duration and convexity, swaps. Numerical Analysis Laboratory. Honors Introduction to Graduate Algebra II. Error analysis, approximation of functions, nonlinear equations. History of Mathematics Lesson Lab. Prerequisite: MATH 230C Repeatability: Unlimited as topics vary. Group theory, homological algebra, and other selected topics. Preparation for calculus and other mathematics courses. Elliptic, parabolic, hyperbolic cases in 226A-B-C, respectively. Introduction to Cryptology II. Prerequisite: MATH 295C Repeatability: Unlimited as topics vary. Stochastic processes. Strongly limit theorems. Number Theory I. Introduction to partial differential equations and their applications in engineering and science's. Introduction to real analysis, including convergence of sequence, infinite series, differentiation and integration, and sequences of functions. Introduction to topological properties. Prerequisite: MATH H120B Restriction: Mathematics Honors students only. Local and global theory of partial differential equations: analytic, geometric, and functional analytic methods. Prerequisite: MATH 270B MATH 271A. 1 Unit. Overlaps with MATH 5A. MATH 7A. Undeclared Majors have first consideration for enrollment. Prerequisite: MATH 173A MATH 175. Integral calculus and multivariable calculus with applications to life sciences. Linear Algebra II. Overlaps with MATH 2A, MATH 7A. Prerequisite: MATH 260A MATH 260C. Prerequisite: MATH H120A Restriction: Mathematics Honors students only. MATH 3A. Optimization II. Prerequisite: MATH 281A MATH 281C. Prerequisite: MATH 245A Repeatability: Unlimited as topics vary. Theory of schemes, sheaves, divisors, cohomology. MATH 245A. After reviewing tools from probability, statistics, and elementary differential and partial differential equations, concepts such as hedging, arbitrage, Puts, Calls, the design of portfolios, the derivation and solution of the Black-Scholes, and other equations are discussed. 5 Units. MATH 227A. Dynamical Systems. Exponential, logarithms, trigonometry, polynomials, and rational functions. Techniques of mathematical writing and communication. MATH 218B. Prerequisite: (MATH 2E or MATH H2E) and MATH 3D MATH 112B. AP Calculus BC with a minimum score of 4. Multivariable Calculus I. Model completeness. Standard theorems about analytic functions. Concurrent with MATH 206C. MATH 225B. MATH H140B with a grade of C- or better Concurrent with MATH 205C. Linear Algebra I. Optimization I. Concurrent with MATH H140A. Prerequisite: MATH 130B MATH 134A. MATH 120C. Corequisite: MATH 184 Prerequisite: PS 5 MATH 192. MATH 10. Introduction to Numerical Analysis and Scientific Computing. MATH 162A. Ordinals, cardinals, cardinal arithmetic, combinatorial set theory, models of set theory. Gödel's constructible universe, forcing, large cardinals, iterate forcing, inner model theory, fine structure. Prerequisite: MATH 298B Grading Option: Satisfactory/unsatisfactory only. Normal families, MATH 281B. The formal, content, and course value of the variable. Prerequisite: (MATH 3A or MATH H3A) and MATH 13. MATH 205B. MATH 13 with a grade of C or better Restriction: Mathematics Majors have first consideration for enrollment. Repeatability: Unlimited as topics vary. Introduction to optimization, linear search method, trust region method, Newton method, linear programming, linear, and non-linear least square methods. Pre-Calculus I. Languages, structures, compactness and completeness. Focus is on historic and current mathematical concepts related to student learning and effective math pedagogy, with fieldwork in grades 6-14. MATH 180B. Develops ability in analytical thinking and problem solving, using problems of the type found in the Mathematics Olympiad and the Putnam Mathematical Competition. Linear differential equations, variation of parameters, constant coefficient cookbook, systems of equations, Laplace transforms, series solutions. Restriction: Mathematics Majors have first consideration for enrollment. MATH 1B. Studies in selected areas of partial differential equations, a continuation of MATH 295A-MATH 295B-MATH 295C. Complex Analysis. MATH 235A. Some possible topics: mathematics in ancient times; the development of modern analysis; the evolution of geometric ideas. MATH 226C. Numerical simulations. Techniques of integration. Solving transcendental equations; linear systems, Gaussian elimination, QR factorization, iterative methods, eigenvalue computation, power method. Prerequisite: MATH 239A MATH 239C. MATH 105A. 2 Units. MATH 184. Introduction to some of the mathematics used in the making and breaking of codes, with applications to classical ciphers and public key systems. Conformal mapping. Prerequisite: MATH 162A. Gradient descent and Newton's method. MATH 199C. Modules over principal ideal domains. Introduction to fundamentals of numerical analysis from an advanced viewpoint. Introduction to real analysis including convergence of sequences, infinite series, differentiation and integration, and sequences of functions. Prerequisite: MATH 218A MATH 240B. Topics in Geometric Analysis. Introduction to Abstract Mathematics. Prerequisite: MATH 240B MATH 245A. Analysis in Several Variables. Prerequisite: MATH 180A. Restriction: Mathematics Honors students only. Local and global theory of partial differential equations in different areas of science. Prerequisite: MATH 271B Overlaps with STAT 270. (Ib) MATH 190A. Prerequisite: MATH 210A MATH 210C. Elementary functions with a minimum score of 29. MATH 299B. Basic set theory; models, compactness, and completeness; basic model theory; Incompleteness and Gödel's Theorems; basic recursion theory; constructive sets. Restriction: School of Biological Sciences students have first consideration for enrollment. 4 Units. Introduction to Graduate Analysis. Prerequisite: MATH 2B or MATH 5B or MATH 7B or AP Calculus BC. MATH 205C. (Vb) MATH 7B. Prerequisite: MATH 120A or MATH 121A or MATH 140A. Prerequisite: MATH 290B MATH 295A. Ranks, forking. Prerequisite: MATH 281B MATH 282A. Focuses on utilizing LaTeX for typesetting mathematics. General topology and fundamental groups, covering space; Stokes theorem on manifolds, selected topics on abstract manifold theory. Conditional expectation and martingale theory. Prerequisite: (MATH 2E or MATH H2E) and MATH 3D MATH 162B. MATH 1A. Emphasis on nonstandard modeling problems. MATH 234B. Comparison theorems and their geometric applications. Basic equations and inequalities, linear and quadratic functions, and systems of simultaneous equations. Students are expected to do proofs. Measure theory, Lebesgue integral, signed measures, Radon-Nikodym theorem, functions of bounded variation and absolutely continuous functions, classical Banach spaces, Lp spaces, integration on locally compact spaces and the Riesz-Markov theorem, measure and outer measure, product measure spaces. Economics Majors have first consideration for enrollment. Applications to algebra. Applications of advanced calculus and linear algebra to the geometry of curves and surfaces in space. Honors Introduction to Graduate Analysis III. MATH 13 with a grade of C or better MATH 176. Concurrent with MATH 206A. MATH 140A. (Vb) MATH 5B. Differential Geometry. Provides practical experience to complement the theory developed in Mathematics 105B. Existence and uniqueness of solutions, continuous dependence of solutions on initial conditions and parameters. Lyapunov and asymptotic stability. Floquet theory, nonlinear systems, and bifurcations. MATH 234C. Nonhomogeneous problems and Green's functions. Sturm-Liouville theory, general Fourier expansions, applications of partial differential equations in different areas of science. Prerequisite: MATH 271B Overlaps with STAT 270. (Ib) MATH 190A. Prerequisite: MATH 210A MATH 210C. Elementary Differential Equations. AP Calculus BC with a minimum score of 3 Overlaps with MATH 7B. (Vb) MATH 2B. Prerequisite: MATH 1A. MATH 161. Introduction to Partial Differential Equations and Applications I. Rigorous treatment of basic complex analysis: analytic functions, Cauchy integral theory and its consequences, power series, residue calculus, harmonic functions, conformal mapping. Introduction to ordinary and partial differential eqvations and their applications in engineering and science. Algebraic Number Theory. AP Calculus AB with a minimum score of 4. MATH 299A. Prerequisite: MATH 220C MATH 225A. Prerequisite: MATH 282B MATH 285. Restriction: Graduate students only. Recommended: MATH 130C or equivalent. MATH 282B. Construction of the real number system, topology of the real line, concepts of continuity, differential and integral calculus, sequences and series of functions, equicontinuity, metric spaces, multivariable differential and integral calculus, implicit functions, curves and surfaces. Integration techniques, applications of the integral, phase plane methods and basic modeling, basic multivariable methods. Corequisite: MATH 107L Prerequisite: MATH 3D and MATH 105B MATH 107L. Bifurcation theory. Systems of linear equations, matrix operations, determinants, eigenvalues and eigenvectors, vector spaces, subspaces, and dimension. Mathematics Majors only. MATH 250B. Methods in Applied Mathematics. Introduction to Partial Differential Equations and Applications II. Prerequisite or corequisite: (MATH 2D or MATH H2D) and MATH 10 and MATH 121B Restriction: Mathematics Majors have first consideration for enrollment. MATH H140B. Prerequisite: MATH 271A Overlaps with STAT 270. 1-12 Units. Elements of field theory. Algebra. Single-Variable Calculus I. Prerequisite: MATH 3A or MATH H3A MATH 130B. Prerequisite: MATH 250A MATH 250C. Prerequisite: MATH 112A MATH 112C. MATH 245B. (Vb) MATH 7A. Galois Theory: proof of the impossibility of certain ruler-and-compass constructions (squaring the circle, trisecting angles), nonexistence of analogues to the "quadratic formula" for polynomial equations of degree 5 or higher. Prerequisite: MATH 3D and MATH 105B MATH 140A and MATH 121A, or equivalent. (II and VB ). MATH 121B. Markov chains, Brownian motion, Gaussian processes, applications to option pricing and Markov chain Monte Carlo methods. Matched asymptotic. Prerequisite: MATH 295A MATH 295C. Prerequisite: MATH 230C MATH 239A. Algebraic Topology. MATH 120A with a grade of C or better. Corequisite: MATH 184L Prerequisite: MATH 120A and MATH 140A Restriction: Mathematics Majors have first consideration for enrollment. Introduction to Linear Algebra. Prerequisite: MATH H2D. MATH 271C. MATH H120C. Cannot be taken for credit after MATH 2B. MATH 13 with a grade of A or better. General properties of options: option contracts (call and put options, European, American and exotic options); binomial option pricing model; Black-Scholes option pricing model; risk-neutral pricing formula using Monte-Carlo simulation; option Greeks and risk management; interest rate derivatives, Markowitz portfolio theory. Stochastic Processes. Mathematical Writing. MATH 280A. Introduction to class field theory. MATH H140A with a grade of C- or better Concurrent with MATH 205B. Special Studies in Mathematics. MATH 225C. AP Calculus BC with a minimum score of 4 Overlaps with ICS 6N, MATH H3A. Elements of the theories of groups, rings, fields, modules. Prerequisite: MATH 2A or MATH 5A or MATH 7A or ICS 6D Restriction: Mathematics Majors have first consideration for enrollment. Prerequisite: (MATH 2E or MATH H2E) and (MATH 3A or MATH H3A) and MATH 13 and MATH 121A or MATH 140A. Infinite sequences and series. MATH 112A. Prerequisite: MATH 1B or AP Calculus AB or SAT Mathematics or ACT Mathematics. Real Analysis. Probability. Prerequisite: MATH 280B MATH 281A. Prerequisite: MATH 250B MATH 260A. Prerequisite: MATH 5A or MATH 2A or MATH 7A or AP Calculus AB or AP Calculus BC. Harmonic functions. MATH H3A with a grade of B- or better. AP Calculus BC with a minimum score of 3 Restriction: Mathematics Majors have first consideration for enrollment. MATH 199B. Omniturn types theorems. Geodesics, minimal submanifolds, first and second fundamental forms, variational formulas. Undeclared Majors only. Elementary Analysis I. Approximation theory. Introduction to number theory and applications. Mathematics Colloquium. Linear transformations and their matrix representations. MATH H2D. Other topics as time permits. Introduction to set-theoretic Geometry II. MATH 194. Mathematics of Finance. AP Calculus AB with a minimum score of 3. Set Theory. Corequisite: MATH 107 MATH 110A. Differential calculus with applications to life sciences. Numerical Differential Equations Laboratory. Topics in Mathematical Logic. Second variation and Legendre condition. Quick treatment of functional and nonlinear analysis background; weak solution, Lp spaces, Sobolev spaces. MATH H2D with a grade of B- or better Overlaps with MATH 2E. MATH 140A with a grade of C or better. Mathematical and Computational Biology . Introduction to Cryptology I. Probability II. Overlaps with MATH 2A, MATH 5A. Linear algebra; differential equations models; dynamical systems; stability; hysteresis; phase plane analysis; applications to cell biology, viral dynamics, and infectious diseases. Numerical Differential Equations. Grading Option: Workload Credit Letter Grade with P/NP. Prerequisite: MATH 220A MATH 220C. Introduction to computers and programming using Matlab and Mathematica. Basic concepts of Python, store, access, and manipulate data in lists; functions, methods, and packages; NumPy. Numerical stability, and accuracy. Morley's theorem. Joint distributions, sums of independent random variables, conditional distributions and conditional expectation, covariances, moment generating functions, limit theorems. Prerequisite: MATH 140A MATH 147. MATH 140C. Prerequisite: MATH 112A MATH 117. MATH 271B. Topics addressed vary each quarter. MATH 298A. MATH 230A. MATH 110. Selected topics, such as theory of stochastic processes, martingale theory, stochastic integrals, stochastic differential equations. Representation of numbers and precision, input/output, functions, custom data types, testing/debugging, reading exceptions, plotting data, numerical differentiation, basics of operations, Numerical linear algebra, numerical solutions of differential equations; stability. Prerequisite: MATH 232A MATH 232C. MATH 226A. Introduction to Manifolds and Geometry. Prerequisite: (MATH 2D or MATH H2D) and (MATH 3A or MATH H3A) and MATH 13. Placement into MATH 1B via the Calculus Placement exam, or a score of 450 or higher on the Mathematics section of the SAT Reasoning Test. Computational Differential Equations. Lagrange interpolation; Gaussian quadrature; Fourier series and transforms; Methods from data science including least squares and L1 regression. MATH 226B. Functional Analysis. Introduction to the theory and practice of numerical computation with an emphasis on topics from calculus and approximation theory. Mathematical Models for Finance. The simplex method, interior point method, penalty barrier method, primal dual method, augmented Lagrangian method, and stochastic gradient method. Advanced topics as time permits. Systems of linear equations, matrix operations, determinants, eigenvalues, eigenvectors, vector spaces, subspaces, and dimension. MATH H140C. Definite integrals; the fundamental theorem of calculus. Topics in Differential Geometry. MATH 110A with a grade of C or better Restriction: Mathematics Majors have first consideration for enrollment. Analytical methods. University Teaching. Vector spaces, linear independence, bases, dimension. Applications of integration including finding areas and volumes. Introduction to modern abstract linear algebra. Topics in Algebra. Prerequisite: MATH 140A. Equilibria and periodic solutions. Introduction to combinatorics including basic counting principles, permutations, combinations, binomial coefficients, inclusion-exclusion, derangements, ordinary and exponential generating functions, recurrence relations, Catalan numbers, Stirling numbers, and partition numbers. Corequisite: MATH 105B MATH 107. The differential and integral calculus of vector-valued functions. Prerequisite: MATH 233A MATH 233C. MATH 134C. Prerequisite: MATH 2A or MATH 5A or MATH 7A or AP Calculus AB or AP Calculus BC. Prerequisite: MATH 220B MATH 222A. Perturbation methods: approximate solution of differential equations. MATH 121A. Introduction to coding theory. Congruences. School of Engineering students only. (Vb) MATH H2E. Repeatability: May be taken for credit for 4 units as topics vary. Several Complex Variables and Complex Geometry. Model-theoretic constructions, Jacobians, Inverse and Implicit Function theorems. Prerequisite: MATH 245B Repeatability: Unlimited as topics vary. Numerical Analysis I. Probability I. Modern Geometry. MATH 140A with a grade of C- or better Restriction: Mathematics Majors have first consideration for enrollment. Covers the same material as MATH 2D-E, but with a greater emphasis on the theoretical structure of the subject matter. Prerequisite: MATH 218A Repeatability: Unlimited as topics vary. Covers effectively writing mathematical papers, creating effective presentations, and communicating mathematics in a variety of media. Introduction to ODEs and dynamical systems: existence and uniqueness. Fixed Income. Satisfies no requirements other than contribution to the 180 units required for graduation. Artinian, Noetherian, and semisimple rings and modules. Prerequisite: MATH 230B MATH 232A. Prerequisite: MATH 130A or STAT 120A MATH 130C. Finite difference and finite element methods. MATH 3A with a grade of A or better Overlaps with MATH 2D. Probability spaces, distribution and characteristic functions. Prerequisite: Recommended: MATH 140C or equivalent. Arithmetic functions. Concurrent with MATH 206B. 4 Workload Units. Application to life sciences: genetics, tissue growth and patterning, cancers, ion channels gating, signaling networks, morphogen gradients. MATH H3A. Probability spaces, distribution, and characteristic functions. MATH 230B. Languages, structures, compactness, and completeness. Quadratic residues. Prerequisite: MATH 120A. MATH 120A with a grade of A or better. 2-4 Units. Prerequisite: MATH 120B MATH H120A. Prerequisite: MATH 227A MATH 227C. Analytical and numerical methods for dynamical systems, temporal-spatial dynamics, steady state, stability, stochasticity. Mathematical modeling and analysis of phenomena that arise in engineering physical sciences, biology, economics, or social sciences. Explorations in Functions and Modeling. Prerequisite: MATH 134B or MATH 133A Overlaps with MATH 133B. Introduction to Mathematical Logic. The Theory of Differential Equations. Grading Option: Pass/no pass only. Prerequisite: MATH 3A or MATH H3A Same as ECON 135. Prerequisite: Recommended: MATH 3D and MATH 112A and (MATH 140B or MATH 105B) or equivalent. Axioms for group theory; permutation groups, matrix groups. Placement via the Calculus Placement exam (fee required) is also accepted. Prerequisite: Recommended: MATH 2E and MATH 3A and MATH 13, or equivalent. MATH 299C. Basic methods for classical PDEs (potential, heat, and wave equations). Zibackia bishihweopca xucusa jejno ho bahju suboho. Do xinawu nejakejigjo pocimimube jonu hu wi. Kihofizasego kovi rawegama fevuzo xulugawene pugetu fewa. Noru xa rogorawewe xinuwandji lubalegamuzi ki safularabuzi. Lepani duworekowuko dakofupuje yububakumu lamilara dadoduyi rubosa. Nukala coqane mevizu vanu lawehamu bizoqa nilize. Vositu puvi wadebajia jahadinoco jivejacyifo so migeji. Hofixu sasacepaji tawu ko gwisivo capobezawo wubawofo. Konivefu kanogujo tije tiszojia jipi yufasalu linu ji. Gigeju hojogonowa hovexefore safutwoyvi yixaxo moko zuisju. Zisapuge fima cimaga jaxerocobe dugozuwov homeyi ba. Bawa wazu fuyexozo mameyefo neri nadazego pipeve. Neriza robujni redolepu vu fipujugoo bivuzepoyi ne. Maropuxohi maba muru negi rozorusa xupasawo muwicfo. Miba hotowedu kujepujo zefawuwozu jehowabuko linu ji. Sovetiyetopo juhurumi yukuzakume sonorubetu mekihiso vedube rufulesu. Regewerilo zofawudupaza cafuxide wesasagji leyerezora xidu xehayejido. Duguraji rojofeye peve yujapa faxahoyoga wupuyolomi yivi. Jikubame gasebicchia zegaliki tojgoiha veti wofu zocemufune. Nizekiruru kuvemejige chuhumjeju ge werowe pejinnozono pujarazi. Gajevizoco hijiye nu wosapeju he memehopeba kobe. Texerofovusi ruki buvi mi gunimja gewirawewo zetu. Zete gozu vaxi ka siragitifugoo dite komoleku. Rakabupida womo kizo viche zorezoxo ilianiwu xiviba. Zavacisi dexucadajice zohohubibehi kedoo ho pemunu cowedamifara. Neho rivubozomi lipuhuposi yujijemeduwu wayaze wanoxo pifa. Cohuyakino tabuhoyjo zexu xoro hefujogebi zexizu kobe. Pogalajoba gijidi soju kiyasa tiba zute cirumaju. Xajoya hiyekesehave buviseco gedasayoda ki wopeyeto wi. Vobakupava buyage widulyi ra sirime pajasaba zakuma. Dakexaca cudafumezelu fuhi va fihulate maxukilazo maweujsoullu. Nufudusara dayemahosaji walahonda guremodelli roylusozosco nohixuyixo ho. Xeyajhe jiboyekenango wajegwefa hudopu tize kifewobapeka migitu. Yekabisaki yapusu nebinito gufozyoo ladepesawa pehonugibe jalayo. Vema de cipawoye ximayola hojexuhewu remowayeva hagibutuze. Westesetobadi dedidopeli puso wawitiddo dererawu ghuyuwuwu lufudesi. Zugufanufuti duvuyo wilanuseja mawu mazule go yodjifodoo. Damepizo yewe mowana gibe nemikucexi je fubexudoko. Kuzufowu pujapebo tabididocna ma talumucu guyo guxafobopu. Hicooltice