MATH 1125Q/1126Q/1131Q/1132Q Calculus Syllabus

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- Review of Functions and Models
- Limits and Rates of Change
  - Including review of trigonometric, exponential and logarithmic functions
- Derivatives
  - Tangent and velocity problems
  - Limit laws
- Differentiation Rules
  - Product and Quotient
  - Chain Rule
  - Implicit Differentiation
  - Derivatives of Logs and Trig functions
  - Rates of Change in Natural and Social Sciences
  - Exponential Growth and Decay
  - Related Rates
- Application of Differentiation
  - Maximum and Minimums
  - Mean Value Theorem
  - Indeterminate Forms and l'Hospital's Rule
  - Optimization
  - Anitderivatives
- Integrals
  - Areas and Distances
  - Definite Integral
  - Fundamental Theorem of Calculus
  - Indefinite Integrals
  - Substitution Rule
  - Approximate Integration (using midpoint and Trapezoidal Rules)
  - Riemann Sums
- Techniques of Integration
  - Integration by Parts
  - Trigonometric Integrals
  - Trigonometric Substitution
  - Integration of Rational Functions by Partial Fractions
  - Improper Integrals
- Applications of Integration
  - Areas between Curves
  - Volumes
  - Volumes by Cylindrical Shells

- Work
- Average Value of a Function
- Arc Length
- Area of a Surface of Revolution
- Physics, Engineering, Economics, Biology and Probability
- Differential Equations
  - Direction Fields and Euler's Method
  - Separable Equations
  - Models
- Curves in Parametric, Vector and Polar Coordinates
- Infinite Sequences and Series
  - Integral Test
  - Comparison Test
  - Alternating Series
  - Absolute Convergence and Ratio and Root Tests
  - Power Series
  - Representations of Functions as Power Series
  - Taylor and Maclaurin Series
  - Applications