

MATH 1311 FALL 2006

CALCULUS I

FINAL EXAM - REVIEW TOPICS

Limits and continuity: computation of limits, limit laws, one-sided limits, infinite limits, limits at infinity, definition of continuity, the Intermediate Value Property

Differentiation: secant lines, tangent lines, the definition of the derivative, interpretations of the derivative

Differentiation rules: linearity, product rule, quotient rule, chain rule, trigonometric functions, exponential and logarithmic functions, implicit differentiation, related rates

Optimization of functions on *closed intervals*: critical points of functions, finding global maxima and minima in both abstract and applied settings

Approximations: linear approximations, Newton's method

Applications of the derivative: the Mean Value Theorem, increasing and decreasing functions, local maxima and minima, the first derivative test, optimizing functions on *open intervals*, higher derivatives, concavity of functions, inflection points, L'Hospital's rule

Curve sketching: roots, positivity/negativity, critical points, intervals of increase/decrease, inflection points, concavity, asymptotes, even/odd functions, etc.

Antiderivatives: indefinite integrals, acceleration/velocity/position problems, substitution in indefinite integrals

Integration: sigma (Σ) notation, partitions and Riemann sums, the definition of the integral, areas and the interpretation of the integral, properties of the integral, the Mean Value Theorem for integrals, the Fundamental Theorem of Calculus (both versions), substitution in definite integrals

Applications of integration: areas between curves, arc length

