FINAL EXAM TOPICS

MATH 166: CALCULUS II

Theorems.

- Fundamental Theorem of Calculus
- Derivative of an Inverse Function
- Taylor's Theorem with Remainder
- L'Hôpital's Rule
- Linearity of Series
- Simple Divergence Test
- Telescoping and Geometric Series
- Comparison Test and Limit Comparison Test
- Integral Test
- Root and Ratio Tests
- Leibniz's Rule
- Uniform Convergence of Power Series
- Continuity of Power Series
- Termwise Integration and Differentiation of Power Series

Definitions.

- $\log(x)$, $\exp(x)$, a^x
- Hyperbolic Functions
- Inverse Functions
- Taylor Polynomials
- Limits Involving Infinity
- Sequences and Series
- Telescoping, Geometric, and Alternating Series
- Absolute and Conditional Convergence
- Integrals Involving Infinity
- Power Series
- Radius/Interval of Convergence

Derivatives.

- Integrals: $\dfrac{d}{dx}\displaystyle\int_{g(x)}^{h(x)} f(t)\,dt$
- Inverse Functions: $\dfrac{d}{dx}f^{-1}(x)$
- Exponential Functions: $\dfrac{d}{dx}g(x)^{f(x)}$

Date: Spring, 2000.

Techniques of Integration.

- Substitution
- Integration by Parts
- Partial Fractions
- Trig Substitutions
- Integrals Involving Rational Functions of $\sin(x)$ and $\cos(x)$
- Computing Improper Integrals

Taylor Polynomials.

- Calculating Taylor Polynomials
- Estimating the Error Term
- o-symbols

Limits.

- Indeterminate Forms
- Calculating Limits with o-symbols
- L'Hôpital's Rule and Extensions
- Limits of Sequences

Series.

- Summing Telescoping and Geometric Series
- Testing Series for Convergence: Absolute and Conditional
- Determining Radius/Interval of Convergence of a Power Series
- Determining the Power Series of a Function
- Standard Power Series: $1/(1 \pm x)$, $\log(1 \pm x)$, e^x, $\sin(x)$, $\cos(x)$
- Summing Power Series using Standard Series, Derivatives, and Integrals