Final exam topics (MA131-002 Spring 2016)

Difference equations

- Represent simple and compound interest using a difference equation
- Use the general solution to a difference equation to solve problems related to financial accounts
- Describe the qualitative behavior of difference equations and graph them

Limits, continuity, and differentiability

- Determining limits, continuity, and differentiability of a function based on its graph
- Using facts about limits of functions and limit laws to evaluate limits

Derivatives

- The concept of the derivative
- Higher derivatives

Rules for differentiation

- Power rule
- General power rule
- Product rule
- Quotient rule
- Derivatives of exponential and logarithmic functions
- Chain rule

Applications of derivative/differentiation rules

- Determining a rate of change
- Determining a rate of change in applications using the chain rule
- Tangent line approximation
- Using information about the derivatives to determine the features of graph of functions
    - First and second derivative rules
    - First and second derivative tests
- Optimization
- Modeling exponential growth and decay, and determining the initial value and growth constant parameters based on given information

Integrals

- Riemann sums and definite integrals

Evaluating (indefinite and definite) integrals

- Antiderivatives and the fundamental theorem of calculus
- Antiderivatives of power functions, exponential functions and 1/x
- Integration by substitution
- Improper integrals

Applications of integrals

- Areas under/between curves
- Finding net change, displacement
- Methods for approximating integrals (midpoint rule, trapezoidal rule, Simpson's rule)