# Exam 4 Topic List

**Rates of Change in the Natural and Social Sciences**

- Find and interpret instantaneous rates of change in any given context
- Solve rectilinear motion problems given either a function or graph of position or velocity

**Related Rates**

- Understand the related rates method (every variable is derived implicitly with respect to time)
- Most common types: Pythag, Cone, Angle, Shadow

**Linearization and Differentials**

- Linearization: Use tangent line to approximate function value and determine whether the approximation is an over- or under-estimate
- Differentials: Use derivative to approximate change in function value
- Make sure you can work application problems for both, and can determine your own function and point of tangency when using linearization to approximate numeric values

**Absolute Extreme Values on an Interval**

- Know this process well: (1) Find critical numbers inside the interval; (2) Determine function values for endpoints and critical number(s); (3) Largest value(s) are absolute max(es) and smallest value(s) are absolute min(s)

**Applied Optimization**

- Understand the applied optimization method
- Most common types: Geometric figures (rectangular garden, container in the shape of rectangular prism, etc.), Closest point(s) to a curve, Cost, Inscribe rectangles inside regions