Objectives for Exam #3

To be well-prepared for Exam #3, you should be able to

- state and understand definitions related to local and global extremes

- find and classify (as local minimizer, local maximizer, or neither) all critical points for a given function on a given domain

- find the global minimum and global maximum for a given function on a given domain

- analyze a given applied optimization problem

- use cartesian or polar coordinates to describe points, curves, and regions in the plane (including transforming from one coordinate system to another if needed)

- use cartesian, cylindrical, or spherical coordinates to describe points, surfaces, and regions in space (including transforming from one coordinate system to another if needed)

- articulate an intuitive and fundamental meaning for each type of integral we have studied

- state and use basic properties of double and triple integrals

- state and apply Fubinis Theorem for double integrals over rectangles in the plane

- give a geometric argument for the area element in polar coordinates

- give a geometric argument for the volume element in cylindrical coordinates and in spherical coordinates

- set up an iterated integral (in a chosen or specified coordinate system) equal to a double integral for a given function and given region in the plane

- set up an iterated integral (in a chosen or specified coordinate system) equal to a triple integral for a given function and given region in space

- evaluate a given iterated integral

- construct and evaluate an integral to compute the area of a planar region

- construct and evaluate an integral to compute the volume of a solid region

- construct and evaluate an integral to compute the total for some quantity given a region and a density for that quantity

- set up a definite integral equal to a curve integral for a given function and a given curve in the plane or in space

- construct and evaluate an integral to compute the length of a given curve

- construct and evaluate an integral to compute the total for some quantity given a curve and a length density along that curve