Objectives for Exam #3

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

• 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 Lagrange multipliers to locate local mimimizers or maximizers of a given constrained optimization problem

• graph polar equations

• 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 coordinates to describe points, surfaces, and regions in space (including transforming from one coordinate system to another if needed)

• know the cylindrical and spherical coordinate transformations and be able to graph simple equations expressed in those coordinates

• articulate an intuitive and fundamental meaning for double and triple integrals

• state and use basic properties of double and triple integrals

• state and apply Fubini’s Theorem as presented in class

• give a geometric argument for the infinitesimal area element in polar 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

• change the order of integration of an iterated integral in cartesian coordinates

• evaluate a given iterated integral

• construct and evaluate a double 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