

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 minimizers 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