Methods of Applied Mathematics Multivariable Calculus Review Topics

Understand the techniques and simple results associated with:

Partial derivatives
Chain rule for functions of more than one variable
Tangent planes to surfaces (including level surfaces).
Directional derivatives
Gradient vector: calculate, interpret (magnitude is maximum slope and direction is direction of maximum slope), and understand connection with level curves and surfaces.

Optimization

- Find critical points of functions of more than one variable.
- Identify critical points as max, min or saddle points using the Hessian
- Use the method of Lagrange multipliers to calculate optimal points subject to some constraint

Double and triple integrals

- setup the limits of integrated integrals for various regions
- know how to change the order of integration with reference to the region of integration.
- Change double integrals to polar coordinates and change triple integrals to cylindrical and spherical polar coordinates
- applications of integration: average values, mass and center of mass, surface area of parametric surfaces

Useul Review Questions from Stewart:

Chapter 11 Review p833 Ex 24,35,36,39,43,44,45,48,51,53,59,61
Chapter 12 Review: p 911 Ex 3,5,9,11,12,13,16,21,25,35,38,41,47

Also look at the concept checks and quiz questions on p 831 and p 910