Typical Topics for Math 18

Differentiation in Several Dimensions

• visualizing/sketching functions of several variables
• partial derivatives, directional derivatives, gradient
• chain rule
• first and second derivative tests in several variables
• Lagrange multipliers

Integration in Several Dimensions

• definition of the integral in several dimensions
• iterated integrals
• polar, cylindrical, and spherical coordinates
• volume and surface area
• center of mass; moments of inertia
• change of variables formula

Vector Calculus

• vector fields
• divergence and curl
• conservative vector fields, potentials
• line and surface integrals
• Green’s Theorem
• The Divergence Theorem
• Stokes’ Theorem