Outline for Exam 2

The exam will cover material from sections 13.1-13.8. The topics by section are


**13.3** Using the double integral to compute area and the average value of a function over a region $R$ in the plane.

**13.4** Double integrals in polar coordinates. Setting up the integral of $f(r, \theta)$ in polar coordinates. The polar area differential $dA = r \, dr \, d\theta$. Switching from rectangular to polar coordinates in double integrals.

**13.5** Triple integrals in rectangular coordinates. Triple iterated integrals. Changing the order of integration.

**13.6** Using double and triple integrals to compute masses and first and second moments. Volumes by triple integration.

**13.7** Triple integrals with cylindrical coordinates $(r, \theta, z)$ and spherical coordinates $(\rho, \varphi, \theta)$. The volume differentials $dV = r \, dr \, d\theta \, dz$ and $dV = \rho^2 \sin \varphi \, d\rho \, d\varphi \, d\theta$.

**13.8** The general change-of-variable formula in two and three dimensions. The Jacobian determinant.