Math 303, Fall 2006
Assignment for October 05-09

I. Read pages 162-173 of the textbook (Riley, Hobson, & Bence, 3rd Edition)

II. Solve Problems 5.11, 5.13, 5.14, 5.16 on pages 180-181 of the textbook and the following problems.

1. Use the method of lagrange multipliers to find the volume of the largest rectangular parallelepiped with faces parallel to x-, y-, and z-axes that is inscribed in the ellipsoid defined by
$$\left(\frac{x}{a}\right)^2 + \left(\frac{y}{b}\right)^2 + \left(\frac{z}{c}\right)^2 = 1,$$
where $a, b, c \in \mathbb{R}^+$.

2. Find the point(s) on the plane defined by $2x + 3y + z = 11$ for which $4x^2 + y^2 + z^2$ has a minimum value.

3. Let $a, b, c \in \mathbb{R}^+$. Find the point(s) on the plane defined by $ax + by + cz = 1$ that are closest to the origin $x = y = z = 0$.

4. Find the shortest distance from the origin to the line of intersection of the planes defined by $2x + y - z = 1$ and $x - y + z = 2$.