1. We may not have done enough absolute maximum and minimum problems. So here is one more: Find the absolute maximum and minimum values of the function 

\[ f(x, y) = e^{-x^2-y^2}(x^2+2y^2) \]

on the disk \( x^2 + y^2 \leq 4 \). (5th. ed. Chapter 14, Review, #56/4th ed., #54).

2. Find the average value of the function \( g(x, y) = x^2 + 4y^2 \) over the triangle of vertices \((0, 0), (1, 0), \) and \((1, 1)\).

3. The following exercise has important applications to the napkin ring industry. It is # 28 of Chapter 15.4 of the 5th ed., #26 of the 4th ed.)

(a) A cylindrical drill with radius \( r_1 \) is used to bore a hole through the center of a sphere of radius \( r_2 \). Find the volume of the ring shaped solid that remains.

(b) Express the volume in part (a) in terms of the height \( h \) of the ring. Notice that the volume depends only on \( h \), not on \( r_1 \) or \( r_2 \).

4. Here is a nice little exercise from the Problems Plus section, "plus" meaning "exercises where you actually may have to think a bit before being able to do them, though the thinking that needs to be done is not so incredibly heavy as to hurt anybody for life."

Evaluate the integral

\[ \int_0^1 \int_0^1 e^{\text{max}(x^2, y^2)} \, dy \, dx \]

where \( \text{max}(x^2, y^2) \) means the larger of the numbers \( x^2 \) and \( y^2 \).

5. A lamina occupies the region inside the circle \( x^2 + y^2 = 2y \) but outside the circle \( x^2 + y^2 = 1 \). Find the center of mass if the density at any point is inversely proportional to its distance from the origin. (Chapter 15, Section 5, #14; 5th and 4th ed.)

6. Find the area of the part of the paraboloid of equation \( z = 4 - x^2 - y^2 \) that lies above the \((x, y)\)-plane. (Chapter 15, Section 6, #6; 5th and 4th ed.)

7. Textbook, 15.6, # 24, 5th ed./15.6, #22, 4th ed. (It has to do with the surface area of the intersection of two cylinders.)

One reason for making this homework due on Friday is that by the weekend you should already be working on triple integrals.