Math 263 Assignment 6  
Due October 24

■ Problems from the text (do NOT turn in these problems):
• Section 16.4 : 1-34.
• Section 16.5 : 3-20, 28, 30, 32.
• Section 16.6 : 3-22, 27-44, 49, 50.

■ Problems to turn in:

1) Find the volume of the solid bounded by the surfaces $z = 3x^2 + 3y^2$ and $z = 4 - x^2 - y^2$.

2) Sketch the region enclosed by the curve $r = b + a \cos \theta$ and compute its area. Here $a$ and $b$ are positive constants, $b > a$.

3) A lamina occupies the region inside the circle $x^2 + y^2 = 2$ 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.

4) Evaluate the triple integral
\[ \iiint_E z dV, \]
where $E$ is bounded by the cylinder $y^2 + z^2 = 9$ and the planes $x = 0$, $y = 3x$ and $z = 0$ in the first octant.

5) Find the volume of the solid bounded by the cylinder $y = x^2$ and the planes $z = 0$, $z = 4$ and $y = 9$.

6) Sketch the solid whose volume is given by the iterated integral
\[ \int_0^2 \int_0^{2-y} \int_0^{4-y^2} dx \, dz \, dy. \]

7) Rewrite the integral
\[ \int_0^1 \int_0^{1-x^2} \int_0^{1-x} f(x, y, z) \, dy \, dz \, dx \]
as an equivalent iterated integral in five other orders.