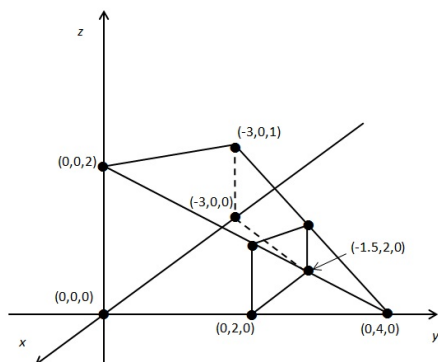Problem-Solving with Double and Triple Integrals
November 9th, 2011
Problems taken from McCallum, Hughes-Hallett, Gleason, et al.; Hass, Weir,
Thomas; and a worksheet created by Prof. Judy Holdener.

1. (a) Set up a double integral to measure the volume of the solid pictured below.

(b) Set up a triple integral to measure the same volume.

2. The Cobb-Douglas production function for a company is

$$P(K, L) = 100K^{0.6}L^{0.4},$$

where K is capital and L is labor. What is the average production level if the number of units of labor varies between 200 and 250 and the number of units of capital varies between 300 and 325?

3. (a) Set up a triple integral to find the volume of the solid in the first octant bounded by the graphs of $z = 4 - x^2$ and $y = 4 - x^2$.

   (b) Set up a triple integral with a different order of integration to find the same volume.

4. Complete number 22 from the handout.

5. Evaluate the following integral.

$$\int_0^4 \int_0^1 \int_{2y}^2 \frac{4\cos(x^2)}{2\sqrt{z}} dx dy dz$$