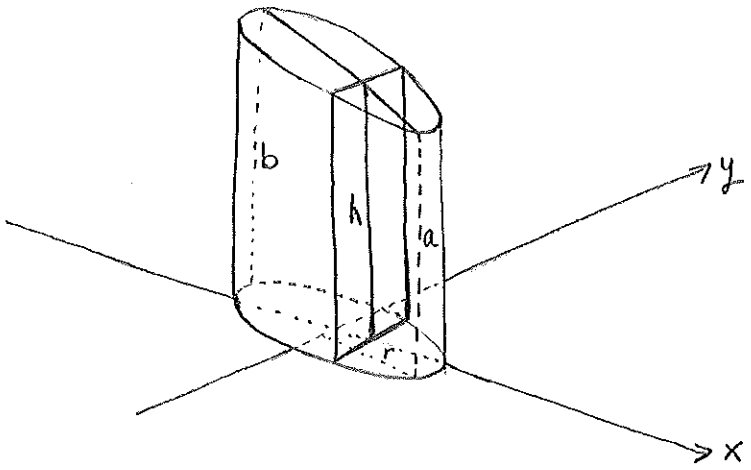
Math.112 ,HW1
Due on Feb. 16,2009 up to 12:40 p.m.

(25 pts.) 1. The top of a circular cylinder of radius r is a plane inclined at an angle to the horizontal as shown in the figure. If the lowest and highest points on the top are at heights a and b, respectively, above the base, find the volume of the cylinder.
Note: There is an easy geometric way to get the answer, but you should also try to do it by slicing. You can use rectangular slices.



(25 pts.)2. Let the base of the solid be the equilateral triangle with altitude 10 cm. Suppose that the cross-sections perpendicular both to the base and to a given altitude of the triangle are semicircles. Find the volume of the solid.

(25 pts.)3. The base of a solid S is in the region between the x-axis and the curve $y = \ln x$ from $x = 1$ to $x = e$. Find the volume of S if every cross-section of S by a plane perpendicular to the $y-$axis is a square.

(25 pts.)4. Use the washer (disk) method to find the volume of the solid of revolution obtained by rotating the region bounded by the curves $y = x^3$, $y = -x$, and $y = 1$ around the line $y = -2$.