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Worksheet 3 – Volumes   - MAC 2312, Fall 2013

1. (Volume of a sphere using the two different methods) Consider the region above the x-axis bounded by the semi-circle $y = \sqrt{R^2 - x^2}$ and rotate this region around the x-axis. Find the formula for the volume of the sphere of radius R by:

(a) The slicing method.

(b) The cylindrical shells method.

2. (This problem is for take-home, but you should start it in class. It is related to pb. 33, section 6.3.)
Suppose you have a solid sphere of radius R. A cylindrical hole with radius r, $r < R$, is to be drilled symmetrically through the center of the sphere, so that the volume of the solid left be exactly half of the volume of the original solid sphere. Find the exact value of the ratio r/R for this to happen.