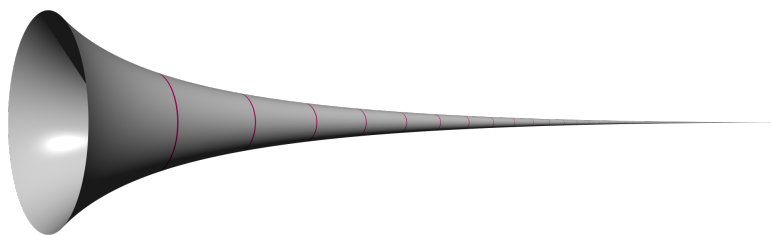


Homework 6

Due Friday, October 17, 2008

Remember: October 20 is the date of the first midterm!

- (a) On page 571, section 11.7, do problems: 1, 6, 9, 10, 17, 31.
- (b) Consider the graph of $f(x) = 1/x$, restricted to $x \in [1, \infty)$. Rotate this graph around the x -axis, to produce



The surface area of this object is infinite, but what is its volume?

- (c) The **Gamma function** is defined as follows:

$$\Gamma(z) = \int_0^{\infty} t^{z-1} e^{-t} dt.$$

Compute $\Gamma(5)$. *Hint: first compute $\Gamma(1)$, and then integrate by parts to find $\Gamma(z)$ in terms of $\Gamma(z-1)$.*[†]

- (d) Evaluate $\int_0^{\pi/2} \frac{x}{\tan x} dx$. This is an extremely difficult integral.

[†]If you are very stuck, look at http://en.wikipedia.org/wiki/Gamma_function

