

13 June 2006

### Quiz 8 - Math 152

Let  $A$  be the area bounded by the curves

$$\begin{aligned}y &= \frac{1}{x} \\x &= 1\end{aligned}$$

1. Find the area of  $A$ .
2. Find the volume when  $A$  is rotated about the  $x$ -axis.

**Solutions.** 1. The area of  $A$  is

$$\int_1^{\infty} \frac{1}{x} dx = \ln |x| \Big|_1^{\infty} = \ln \infty - \ln 1 = \infty$$

2. A cross-section at some  $x$ -value will be a circle with area  $\pi \frac{1}{x^2}$ . Therefore, the volume we seek is

$$\int_1^{\infty} \frac{\pi}{x^2} dx = \left( \frac{-\pi}{x} \right) \Big|_1^{\infty} = \frac{-\pi}{\infty} + \frac{\pi}{1} = \pi$$

Not a contradiction!