Name(s):

Math 258 Volumes October 23, 2015

1. We have seen that the integral $\int_1^\infty \frac{1}{x}\,dx$ diverges to ∞. This integral represents the area of a region in $\mathbb{R}^2$. What is the volume of the solid obtained by rotating the same region about the x-axis?

2. A water tank has the shape of a sphere with a diameter of 10ft. If the depth of the water in the tank is 7ft, what percent of the tank is being used?

3. Determine the volume of the solid obtained by rotating the region inside the circle $(x-2)^2+y^2=1$ about the y-axis (this kind of doughnut-shaped region is called a *torus*).

4. Each integral represents the volume of a solid of revolution. Describe the solid (using words or a sketch).

a) $\displaystyle\int_0^2 \frac{2\pi}{1+x^2}\,dx$

b) $\displaystyle\int_0^{\frac{\pi}{2}} \pi(1-\sin^2 x)\,dx$

c) $\displaystyle\pi\int_0^3 (y+1)^2-(y-1)^4\,dy$