Math 221 Queen's University, Department of Mathematics

**Vector Calculus, tutorial 2**

September 2013

**1.** Volume in the first octant bounded by cylinder $z = 16 - x^2$ and the plane $y = 5$. Draw a diagram, and compute the volume.

**2.** The volume bounded by the planes

$$z = 0, z = x, x + y = 2, y = x.$$

These four planes bound a finite region in $\mathbb{R}^3$. Sketch the planes, and determine the volume by triple integral.

**3.** Volume bounded by the cylinders $x^2 + y^2 = r^2$ and $y^2 + z^2 = r^2$.

This is a challenging question. Try to compute the volume by looking at the region **D** in the x-y plane bounded by the circle $x^2 + y^2 = r^2$.