Name:
ID:

Math 2D: Quiz 8

(5) **1.** Evaluate $\iiint_E \sqrt{x^2+y^2}dV$, where E is the region bounded by the cylinder $x^2+y^2=4$, and the planes $z=0$, $z=1$

Converting to cylinderical coordinates we have

$$\begin{aligned}\int_0^{2\pi}\int_0^2\int_0^1 r^2 dz dr d\theta &= \int_0^{2\pi} d\theta \int_0^2 r^2 dr \int_0^1 dz \\ &= (2\pi)\left(\frac{8}{3}\right)(1) = \frac{16\pi}{3}\end{aligned}$$

(5) **2.** Evaluate $\iiint_E xyz dV$, where E is the region bouned by the sphere $\rho=2$, $\rho=4$, and the cone $\phi=\pi/3$.

In sphereical coordinates we have

$$\begin{aligned}&= \int_0^{2\pi}\int_0^{\pi/3}\int_2^4 \rho\sin(\phi)\cos(\theta)\rho\sin(\phi)\sin(\theta)\rho\cos(\phi)\rho^2\sin(\phi)d\rho d\phi d\theta \\ &= \int_0^{2\pi}\sin(\theta)\cos(\theta)d\theta\int_0^{\pi/3}\sin^3(\phi)\cos(\phi)d\phi\int_2^4\rho^5 d\rho \\ &= \left(\frac{\sin^2(\theta)}{2}\right)_0^{2\pi}\left(\frac{\sin^4(\theta)}{4}\right)_0^{\pi/3}\left(\frac{\rho^6}{6}\right)_2^4 = 0\end{aligned}$$