

Name: _____

There are 20 points possible on this quiz. This is a closed book quiz and closed note quiz. Calculators are not allowed. If you have any questions, please raise your hand.

1. (8 points) Evaluate the iterated integral $\int_0^3 \int_0^1 \int_0^{1+y^2} y \sin(z) dz dy dx$.

2. (6 points) Write the triple integral $\iiint_E x^2 dV$ in cylindrical coordinates where E is the solid that lies within the cylinder $x^2 + y^2 = 2$, above the plane $z = 0$ and below the cone $z^2 = x^2 + y^2$. [You do not need to evaluate the integral.]

Formulas for Spherical Coordinates:

$$z = \rho \cos \phi, x = \rho \sin \phi \cos \theta, y = \rho \sin \phi \sin \theta, dV = \rho^2 \sin \phi d\rho d\theta d\phi.$$

3. (6 points) Set up the integral to find the volume of the part of the solid ball $\rho \leq a$ that lies between the cones $\phi = \pi/6$ and $\phi = \pi/3$.