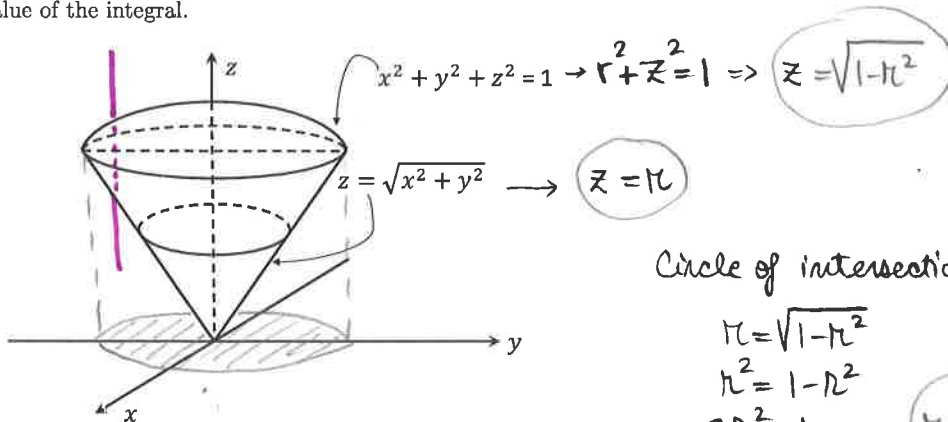


NAME: Solutions

Math 2551 (L1-L3)
3/30/2016

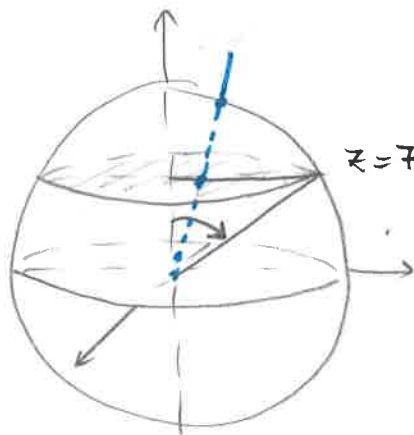
Quiz 8

1. Using *cylindrical coordinates*, set up the triple integral to compute the volume of the solid enclosed by the sphere $x^2 + y^2 + z^2 = 1$ and the cone $z = \sqrt{x^2 + y^2}$ (pictured below). You do not have to compute the value of the integral.



$$V = \int_0^{2\pi} \int_0^{1/\sqrt{2}} \int_r^{\sqrt{1-r^2}} r \, dz \, dr \, d\theta$$

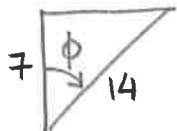
2. Use *spherical coordinates* to set up the triple integral to compute the volume of the smaller region cut from the solid sphere $\rho \leq 14$ by the plane $z = 7$. You do not have to compute the value of the integral.



$$z = 7 \Rightarrow \rho \cos \phi = 7$$

$$\rho = 7 / \cos \phi$$

$$\int_0^{2\pi} \int_0^{\pi/3} \int_{7/\cos \phi}^{14} \rho^2 \sin \phi \, d\rho \, d\phi \, d\theta$$



$$\cos \phi = \frac{7}{14} = \frac{1}{2}$$

$$\Rightarrow \phi = \pi/3$$