Lecture $21 - 2$ Worksheet

July 8, 2021

1. Write the point given in cylindrical coordinates as $r = 1$, $\theta = \frac{\pi}{4}$, and $z = \sqrt{3}$ in spherical coordinates.

2. Write the cone given in cylindrical coordinates by $z = 2r$ as an equation in spherical coordinates.

3. Write the sphere centered at $(1, 0, 0)$ of radius 1 in spherical coordinates.

4. Let E be the solid bounded between the sphere $x^2 + (y-2)^2 + z^2 = 4$ and $(x-2)^2 + y^2 + z^2 = 4$. Set up, but do not evaluate, the integral

$$\iiint_E \frac{z}{x+y} \, dA$$

   in spherical coordinates.

5. Use an integral in spherical coordinates to find the volume of the sphere of radius 1, centered, say, at the origin.