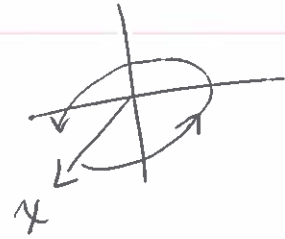
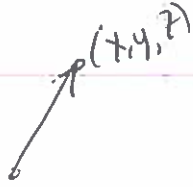


Spherical Coordinates

$$\rho = r_{ho}$$

$$\phi = \text{phi}$$

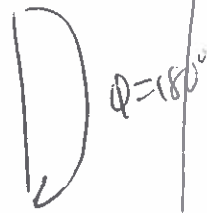
$$\Theta = \text{theta}$$



$$\rho = \sqrt{x^2 + y^2 + z^2}$$



$$0 \leq \Theta \leq \frac{2\pi}{360^\circ}$$



$$\begin{aligned} x &= 2 \\ y &= 4 \\ z &= 2 \end{aligned}$$

$$\begin{aligned} \rho &= \sqrt{4 + 16 + 4} \\ &= \sqrt{24} = 4.89 \end{aligned}$$

$$\cos \phi = \frac{z}{4.89}$$

$$\phi = 65.91^\circ$$

$$x = \rho \cos \Theta \sin \phi$$

$$y = \rho \sin \Theta \sin \phi$$

$$z = \rho \cos \phi$$

$$\rho = 5$$

$$\Theta = 70^\circ$$

$$\phi = 50^\circ$$

$$x = 5 \cos 70^\circ \sin 50^\circ \approx 1.31$$

$$y = 5 \sin 70^\circ \sin 50^\circ = 3.58$$

$$z = 5 \cos 50^\circ = 3.21$$

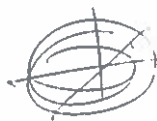
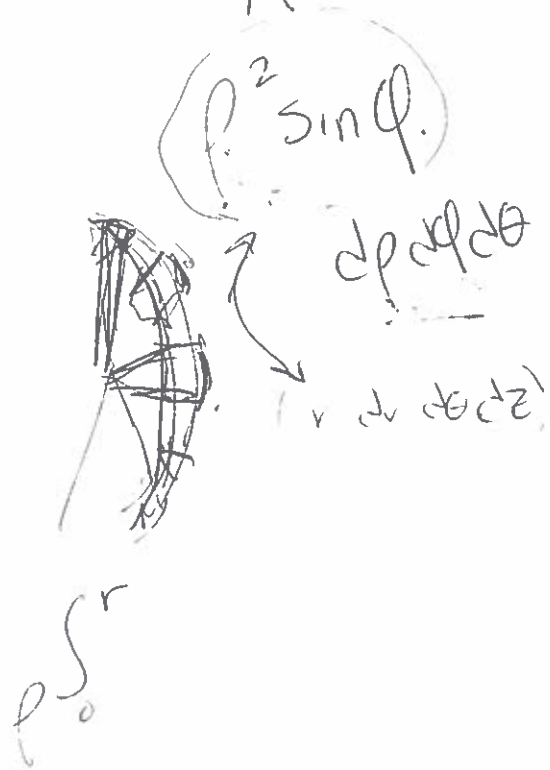
$$\frac{y}{x} = \frac{4}{2} = \frac{\rho \sin \theta}{\rho \cos \theta} = \tan \theta$$

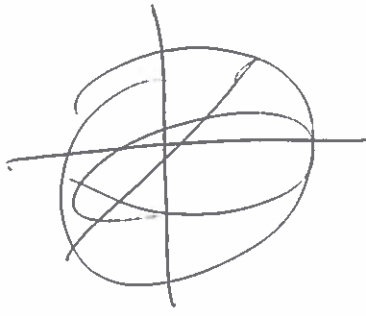
$$\tan \theta = \frac{y}{x} \quad \theta = \tan^{-1}(2) = 63.43^\circ$$

$\int f(x) dx$
Height width

$$\int \int \int_Q f(x, y, z) dV$$

$$f(\rho \cos \theta \sin \phi, \rho \sin \theta \sin \phi, \rho \cos \phi)$$





$$\int_{\phi=0}^{\pi} \int_{\theta=0}^{2\pi} \int_{r=0}^{\text{radius}} f(\rho, \theta, \phi) \rho^2 \sin \phi \, d\rho \, d\theta \, d\phi$$



$$\int_{\phi=0}^{\pi/4} \int_{\theta=0}^{2\pi} \int_{r=0}^{\text{radius}} \rho^2 \sin \phi \, d\rho \, d\theta \, d\phi$$



<p>GROUP NAME: <u>42</u></p> <p>Logo:</p>	<p>Student Names (First and Last)</p> <p>Speaker/Presenter: <u>BP</u></p>
<p>Date: <u>11-7-13</u></p> <p>Topics:</p>	<p>Writer/Prep: <u>Keyla</u></p> <p>QC/Leader: <u>Gory G</u></p>

Instructions:

Handwritten work showing calculations for the volume of a cylinder:

$$V = \pi r^2 h$$

$$= \pi (10)^2 (20)$$

$$= \pi (100) (20)$$

$$= \pi (2000)$$

$$\approx 204176.817$$

$$= \pi 651000$$