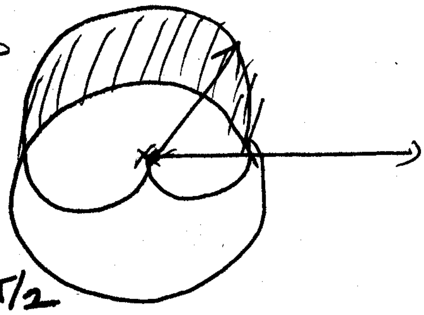
Math 201-16 Quize #2A Sem 041

Name: Key I.D.#__________ Serial #_____

Q1: Find the area inside the polar curve $r = 1 + \sin\theta$ and outside the curve $r = 1$.

$1 + \sin\theta = 1 \Rightarrow \sin\theta = 0$

so $\theta = 0, \pi$



$$A = \frac{1}{2}\int_0^{\pi}\left[(1+\sin\theta)^2 - 1^2\right]d\theta$$

$$= 2\cdot\frac{1}{2}\int_0^{\pi/2}\left[1 + 2\sin\theta + \sin^2\theta - 1\right]d\theta = \int_0^{\pi/2}\left(2\sin\theta + \frac{1}{2} - \frac{1}{2}\cos 2\theta\right)d\theta$$

$$= \left[-2\cos\theta + \frac{\theta}{2} - \frac{1}{4}\sin 2\theta\right]_0^{\pi/2} = 0 + 2 + \frac{\pi}{4} = 2 + \frac{\pi}{4}$$

Q2: Find equation of the sphere that is centered at $(2,1,0)$, and tangent to the $xz-plane$.

$r = |1| = 1$

The eq. is $(x-2)^2 + (y-1)^2 + z^2 = 1$

Q3: Find the magnitude of $\mathbf{u}+\mathbf{v}$ and $\mathbf{u}-\mathbf{v}$, where $\mathbf{u} = \langle 1,2,-1\rangle$ and $\mathbf{v} = \langle -2,1,0\rangle$.

$\vec{u} + \vec{v} = \langle -1, 3, -1\rangle$, $\vec{u} - \vec{v} = \langle 3, 1, -1\rangle$

$\|\vec{u} + \vec{v}\| = \sqrt{1+9+1} = \sqrt{11}$

$\|\vec{u} - \vec{v}\| = \sqrt{9+1+1} = \sqrt{11}$