

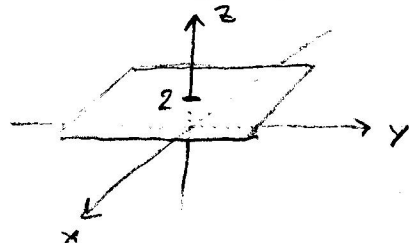
Math 203 Homework 4

Section 11.7

#54) $\rho = \frac{2}{\cos \phi}$

$\rho \cos \phi = 2$

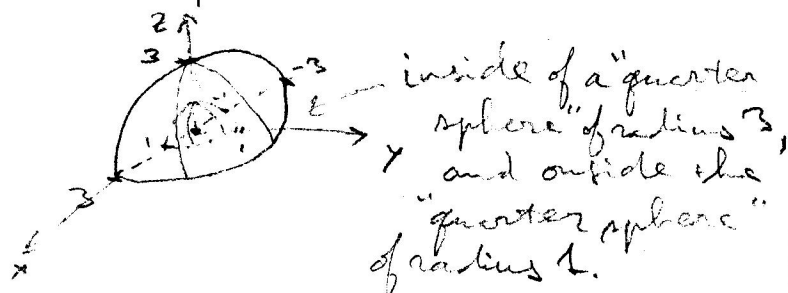
$z = 2$



#114) $0 \leq \theta \leq \pi$

$0 \leq \phi \leq \pi/2$

$1 \leq \rho \leq 3$



#102) $x^2 + y^2 = z$

a. $r^2 = z$

b. $\rho^2 \sin^2 \phi \cos^2 \theta + \rho^2 \sin^2 \phi \sin^2 \theta = \rho \cos \phi$

$\rho^2 \sin^2 \phi = \rho \cos \phi$

$\rho = \cot \phi \csc \phi$

Section 12.1

#17) $\vec{PQ} = (1, -1, 12)$

$\vec{r}(t) = (-2+t, 5-t, -3+12t)$

or:

$x = -2+t$

$y = 5-t$

$z = -3+12t$

#18) $\vec{PQ} = (-4, 4, -3)$. $\vec{r}(t) = (1-4t, -6+4t, 8-3t)$ #19) $\vec{r}(t) \cdot \vec{u}(t)$

$x = 1-4t$

$y = -6+4t$

$z = 8-3t$

$= (3t-1) \cdot t^2 + \frac{1}{4} t^3 \cdot (-8)$

$+ 4 \cdot (t^3)$

$= 3t^3 - t^2 - 2t^3 + 4t^3$

$= 5t^3 - t^2$

#20) $\vec{r}(t) \cdot \vec{u}(t) = 12 \cos t \sin t - 12 \sin t \cos t + t^2(t-2) = t^3 - 2t^2$

Section 12.2 #28

$\vec{r}(t) = (t, 2t+3, 3t-5)$

a) $\vec{r}'(t) = (1, 2, 3)$

c) $\vec{r}'(t) \cdot \vec{r}''(t) = 0$

b) $\vec{r}''(t) = (0, 0, 0)$

the result is a scalar-valued function.