MATH 201.4 (082)

Quiz 3- Sections 12.5-7 Duration: 20mn

Name: ID number:

1.)(4pts) Find the equation of the plane that passes through the point $(1,2,3)$ and contains the line $x=3t,\ y=1+t,\ z=2-t$.

2.)(4pts) Identify and sketch the surface of equation $4y^2+z^2-x-16y-4z+20=0$.

3.)(2pts) Identify (but do not sketch) the surface whose equation in spherical coordinates is $\rho\sin\phi=2$.

1.) $\frac{x}{3}=\frac{y-1}{1}=\frac{z-2}{-1}$

$\vec{u}=(3,1,-1)$ is a vector of the line (L).

$A(0,1,2)\in(L)$

$B(1,2,3)$ $\quad \vec{v}=\overrightarrow{AB}=\langle 1,1,1\rangle$

$\vec{u}\times\vec{v}=\begin{vmatrix}\vec{i}&\vec{j}&\vec{k}\\3&1&-1\\1&1&1\end{vmatrix}$

$=\langle 2,-4,2\rangle$

$M(x,y,z)\in P \Leftrightarrow \overrightarrow{AM}\cdot(\vec{u}\times\vec{v})=0$

$2x-4(y-1)+2(z-2)=0$

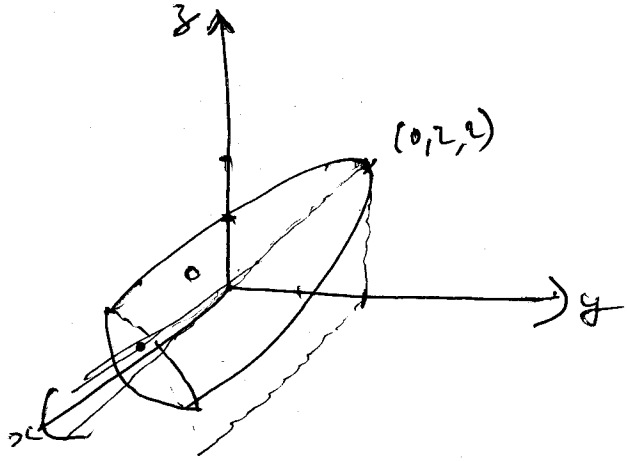
$\boxed{x-2y+z=0}$

2.) $4y^2+z^2-x-16y-4z+20=0$

$4[(y-2)^2-4]+[(z-2)^2-4]-x+20=0$

$4(y-2)^2+(z-2)^2-x=0$

This is an elliptic paraboloid.



3.) $\begin{cases}x=\rho\sin\phi\cos\theta\\y=\rho\sin\phi\sin\theta\\z=\rho\cos\phi\end{cases}$

$\rho\sin\phi=2 \Rightarrow \begin{cases}x=2\cos\theta\\y=2\sin\theta\end{cases}$

$x^2+y^2=4$

This is a cylinder.