MATH 201.5 (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 $(6,0,-2)$ and contains the line $x=4-2t$, $y=3+5t$, $z=7+4t$.

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

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

1.) $\dfrac{x-4}{-2}=\dfrac{y-3}{5}=\dfrac{z-7}{4}$

$\vec{u}=\langle -2,5,4\rangle$ is a vector of the line (L).

$A(4,3,7)\in(L)$; $B(6,0,-2)$

$\vec{v}=\vec{AB}=\langle 2,-3,-9\rangle$

$$\vec{u}\times\vec{v}\ \begin{vmatrix}\vec{i} & \vec{j} & \vec{k}\\ -2 & 5 & 4\\ 2 & -3 & -9\end{vmatrix}$$

$=-33\vec{i}-10\vec{j}-4\vec{k}$

$M\in(P)\iff\vec{AM}\cdot(\vec{u}\times\vec{v})=0$

$-33(x-4)-10(y-3)-4(z-7)=0$

$$\boxed{33x+10y+4z+190=0}$$

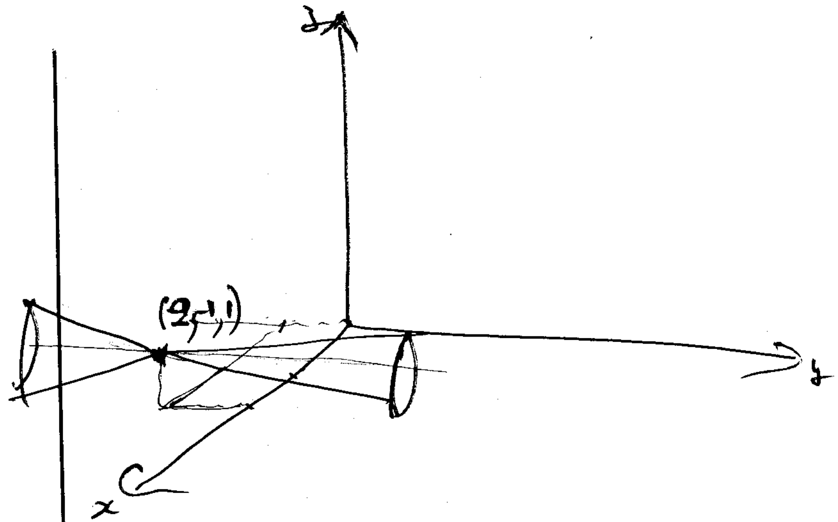
2.) $x^2-y^2+z^2-4x-2y-2z+4=0$

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

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

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

This is a Cone.



3.) $x=\rho\sin\phi\cos\theta$

$y=\rho\sin\phi\sin\theta$

$z=\rho\cos\phi$

$\rho\cos\phi=2\Rightarrow z=2$

This represents a plane.