MATH 201.1 (091)

Quiz 3 (Chap. 12.5-~~7~~) Duration: 15mn

Name: ID number:

1.)(5pts) Find parametric equations of the line through the point $P(5,0,-2)$ that is parallel to the planes $x-4y+2z=0$ and $2x+3y-z+1=0$.

2.)(5pts) Identify and sketch the surface of equation $4x^2+4y^2+z^2+8y-4z=-4$.

1.) Let $\vec{n_1}$ and $\vec{n_2}$ normal vectors to the planes $x-4y+2z=0$ and $2x+3y-z+1=0$.

$\vec{n_1}\times\vec{n_2}$ is a vector that is parallel to both planes.

$$\vec{n_1}\times\vec{n_2} = \begin{vmatrix} \vec{i} & \vec{j} & \vec{k} \\ 1 & -4 & 2 \\ 2 & 3 & -1 \end{vmatrix}$$

$$= \langle -2, 5, 11 \rangle.$$

Thus, the equation of the line is

$$\boxed{\frac{x-5}{-2} = \frac{y}{5} = \frac{z+2}{11}}$$ symmetric equations

or

$$\begin{cases} x = 5-2t \\ y = 5t \\ z = -2+11t \end{cases}$$ Parametric equations

2) $4x^2+4y^2+z^2+8y-4z=-4$

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

$x^2+(y+1)^2+\frac{(z-2)^2}{4}=1$

This is an ellipsoid.