Name: Key

Quiz 2A

MAC2313 L4-L6

1. [6 pts] Find BOTH parametric and symmetric equations for the line through the point $(4, -6, 0)$ and perpendicular to both $\vec{u} =< -1, 2, -3 >$ and $\vec{v} =< -1, -2, 1 >$. Use the parameter t.

$$\vec{u} \times \vec{v} = \det \begin{vmatrix} i & j & k \\ -1 & 2 & -3 \\ -1 & -2 & 1 \end{vmatrix} = i(2-6) - j(-1-3) + k(2+2) = \langle -4, 4, 4 \rangle$$

direction vector

$$\begin{cases} x = -4t + 4 \\ y = 4t - 6 \\ z = 4t \end{cases}$$

parametric equations

$x = -4t + 4 \Rightarrow \frac{x-4}{-4} = t$

$y = 4t - 6 \Rightarrow \frac{y+6}{4} = t$

$z = 4t \Rightarrow \frac{z}{4} = t$

$$\frac{x-4}{-4} = \frac{y+6}{4} = \frac{z}{4}$$

symmetric equation

2. [4 pts] Reduce the equation to one of the standard forms and identify the surface.

$$5x^2 + z^2 - 5y - 4z = 0$$

$5x^2 + z^2 - 4z = 5y$

$5x^2 + z^2 - 4z + (2)^2 = 5y + (2)^2$

$5x^2 + (z-2)^2 = 5y + 4$

$x^2 + \frac{(z-2)^2}{5} = y + \frac{4}{5}$

either accepted

- two squared
- both positive
- equal to unsquared variable

The surface is an elliptic paraboloid.