Math2605 Quiz2

Name:

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1. Consider the line passing through

$$z_0 = \begin{bmatrix}1\\2\\0\end{bmatrix} \text{ and } z_1 = \begin{bmatrix}2\\1\\1\end{bmatrix}$$

Find a system of equations for the line.
Solution:

tangent vector $v = \begin{bmatrix}1\\-1\\1\end{bmatrix}$

normal vectors $a_1 = \begin{bmatrix}1\\1\\0\end{bmatrix}$ $a_2 = \begin{bmatrix}0\\1\\1\end{bmatrix}$

then $x + y = 3$, $y + z = 2$

2. Consider the plane given by

$$x + 2y - z = 0$$

Let $p = \begin{bmatrix}1\\-1\\2\end{bmatrix}$. What is the distance from p to the plane?
Solution:

$x_0 = \begin{bmatrix}1\\0\\0\end{bmatrix}$, $\vec{p}x_0 = \begin{bmatrix}0\\1\\-2\end{bmatrix}$

$\vec{a} = \begin{bmatrix}1\\2\\-1\end{bmatrix}$, $\vec{u} = \frac{1}{\sqrt{6}}\begin{bmatrix}1\\2\\-1\end{bmatrix}$

$\vec{p}x_{0\|} = \frac{2}{3}\begin{bmatrix}1\\2\\-1\end{bmatrix}$

distance is $\frac{2}{3}\sqrt{6}$