contact email: donsen2 at hotmail.com

MATH221 01 problems Name, ID

1. Find the equation of the sphere which has the two planes $x + y + z = 3$, $x + y + z = 9$ as tangent planes if the center of the sphere is on the planes $2x - y = 0, 3x - z = 0$.

2. Explain why the system

$$
\begin{aligned}
u + v + w &= 2 \\
u + 2v + 3w &= 1 \\
v + 2w &= 0
\end{aligned}
$$

is singular by finding a combination of the three equations that adds up to $0 = 1$. What value should replace the last zero on the right side to allow the equations to have solutions-and what is one of the solutions?

3. Consider the following system of equations:

$$u + 3v + 2w = 6$$
$$2u + 5v + 4w = 1$$
$$3u + 8v + 6w = 7$$

What do you know about the equations? Describe the equations geometrically and algebraically (How many solutions does the system have?).

4. Find a matrix A such that

$$A \begin{pmatrix} 2 \\ 0 \end{pmatrix} = \begin{pmatrix} 6 \\ 10 \end{pmatrix} \text{ and } A \begin{pmatrix} 1 \\ 3 \end{pmatrix} = \begin{pmatrix} -3 \\ 2 \end{pmatrix}$$

What is $A \begin{pmatrix} 3 \\ 3 \end{pmatrix}$?