SOLUTIONS

Math 2568 (§75) – Feb. 17, 2017 Full Name: _____

Quiz 4

Answers without proper justification will receive NO credit.

Problem 1. *(2 points)* Find the equation of the plan through the point $(3, 8, 1)$ and parallel to the plane with equation $x + 2y - 2z = 4$.

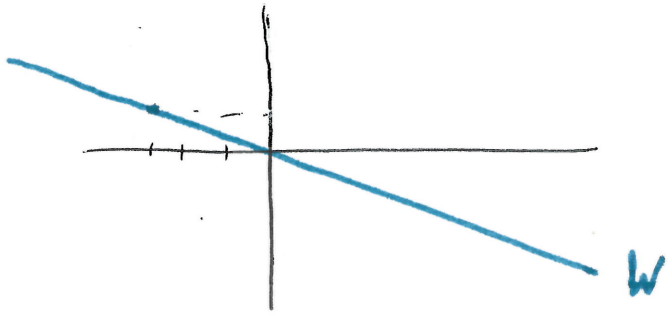
Parallel planes have the same normal,

Eqn $x + 2y - 2z = [1\ 2\ -2]\begin{bmatrix} 3 \\ 8 \\ 1 \end{bmatrix} = 3 + 16 - 2 = 17$

$\boxed{x + 2y - 2z = 17}$

Problem 2. *(1 point)* Sketch a graph of $W = \{x = \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} \text{ in } \mathbb{R}^2 : x_1 = -3x_2\}$.

W is the line with direction $(-3, 1)$ through the origin



Problem 3. *(2 points)* Decide if $\begin{bmatrix} 1 \\ 1 \\ 3 \end{bmatrix}$ belongs to $\text{Sp}(\begin{bmatrix} 1 \\ 1 \\ -1 \end{bmatrix}, \begin{bmatrix} 1 \\ 2 \\ 0 \end{bmatrix})$.

By definition we must find x, y giving $\begin{bmatrix} 1 & 1 \\ 1 & 2 \\ -1 & 0 \end{bmatrix}\begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 1 \\ 1 \\ 3 \end{bmatrix}$

$$\left[\begin{array}{cc|c} 1 & 1 & 1 \\ 1 & 2 & 1 \\ -1 & 0 & 3 \end{array}\right] \xrightarrow[R_3 \to R_3 + R_1]{R_2 \to R_2 - R_1} \left[\begin{array}{cc|c} 1 & 1 & 6 \\ 0 & 1 & 0 \\ 0 & 1 & 3 \end{array}\right] \xrightarrow{R_3 \to R_3 - R_2} \left[\begin{array}{cc|c} 1 & 1 & 6 \\ 0 & 1 & 0 \\ 0 & 0 & 3 \end{array}\right]$$

INCONSISTENT

A: $\begin{bmatrix} 1 \\ 1 \\ 3 \end{bmatrix}$ does NO belong to the $\text{Span}(\begin{bmatrix} 1 \\ 1 \\ -1 \end{bmatrix}, \begin{bmatrix} 1 \\ 2 \\ 0 \end{bmatrix})$.