Name ___Yue Guan___

Mathematics 1553
Quiz 3
Prof. Margalit
Section HP1 / HP2
11 September 2015

1. Write the parametric form of the solution to the matrix equation

$$\begin{pmatrix} 1 & 0 & 1 \\ 0 & 1 & 0 \end{pmatrix} \begin{pmatrix} x_1 \\ x_2 \end{pmatrix} = \begin{pmatrix} -2 \\ 8 \end{pmatrix}$$

$$\left(\begin{array}{ccc|c} 1 & 0 & 1 & -2 \\ 0 & 1 & 0 & 8 \end{array} \right) \longrightarrow \begin{cases} x_1 = -2 - x_3 \\ x_2 = 8 \\ x_3 \text{ is free} \end{cases}$$

$$v = \begin{pmatrix} -2 \\ 8 \\ 0 \end{pmatrix} + x_3 \begin{pmatrix} -1 \\ 0 \\ 1 \end{pmatrix}$$

Write the parametric form of the solution to the associated homogeneous matrix equation.

$$v_{homo} = x_3 \begin{pmatrix} -1 \\ 0 \\ 1 \end{pmatrix}$$

True/~~False~~ There is a vector (b_1, b_2) so that the set of solutions to

$$\begin{pmatrix} 1 & 0 & 1 \\ 0 & 1 & 0 \end{pmatrix} \begin{pmatrix} x_1 \\ x_2 \end{pmatrix} = \begin{pmatrix} b_1 \\ b_2 \end{pmatrix}$$

is the z–axis in $\mathbb{R}^3$. Explain your answer.

False, because z axis passes through the origin, so if it is a solution then it must be a homogeneous solution. However, we find the homogeneous solution is $x_3 \begin{pmatrix} -1 \\ 0 \\ 1 \end{pmatrix}$, which is obviously not the z axis.