

SHOW YOUR WORK FOR FULL CREDIT.

1. Suppose the augmented matrix of a system of three linear equations in four unknowns has a pivot position in every row.

(a) Give an example of an augmented matrix, in reduced echelon form, such that the linear system is consistent.

$$\left[\begin{array}{ccccc} 1 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \end{array} \right]$$

(b) Give an example of an augmented matrix, in reduced echelon form, such that the linear system is inconsistent.

$$\left[\begin{array}{ccccc} 1 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{array} \right]$$

2. Complete the following sentence using the concept of pivot columns. *Do not* refer to free variables.

If a linear system is consistent, then the solution is unique if and only if EVERY

COLUMN OF THE COEFFICIENT MATRIX IS A PIVOT COLUMN.

3. Give an example of a consistent system of two equations in three unknowns.

$$\left. \begin{array}{l} x_1 - x_2 + x_3 = 1 \\ x_3 = 1 \end{array} \right\} \begin{array}{l} x_3 = 1 \\ x_1 = x_2 \end{array}$$

4. Give an example of an inconsistent system of two equations in three unknowns.

$$\begin{array}{l} x_1 + x_2 + x_3 = 0 \\ x_1 + x_2 + x_3 = 1 \end{array}$$