Linear Algebra
Quiz 8

Name:_____

You have 10 minutes to complete this quiz. If you have a question raise your hand and remain seated. In order to receive full credit your answer must be **complete**, **legible** and **correct**. Show your work, and give adequate explanations.

1. Balance the following chemical equation.

$$CaCl_2 + Na_3PO_4 \longrightarrow Ca_3(PO_4)_2 + NaCl$$

(Calcium chloride and tribasic sodium phosphate react to produce tricalcium phosphate and sodium chloride.)

System is

$$A\mathbf{x} = \begin{bmatrix} 1 & 0 & -3 & 0 \\ 2 & 0 & 0 & -1 \\ 0 & 3 & 0 & -1 \\ 0 & 1 & -2 & 0 \\ 0 & 4 & -8 & 0 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \\ 0 \\ 0 \\ 0 \end{bmatrix} = \mathbf{0}.$$

Gauss-Jordan form of A is

$$\begin{bmatrix} 1 & 0 & 0 & -1/2 \\ 0 & 1 & 0 & -1/3 \\ 0 & 0 & 1 & -1/6 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \end{bmatrix}.$$

Solution is

$$3CaCl_2 + 2Na_3PO_4 \longrightarrow Ca_3(PO_4)_2 + 6NaCl.$$