

Name: \_\_\_\_\_ / 10

There are 10 points possible on this quiz. No aids (book, calculator, etc.) are permitted. **Show all work for full credit.**

1. (2 points) Formally state the definition of a **nonsingular matrix**.

2. (4 points) Determine if the matrix below is singular or nonsingular. Explain your answer.

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

3. (4 points) Below you are given a system of linear equations, the matrix form of the system (matrix A), and an echelon form of matrix A (matrix B). Find a solution to the system of linear equations. Express the solution set using vectors. Identify a particular solution and identify the solution set of the homogeneous system.

$$\begin{cases} w + 3x + y = 5 \\ w + 3x + 2y + 4z = 4 \\ 2w + 6x + 4y + 8z = 8 \end{cases} \quad A = \begin{bmatrix} 1 & 3 & 1 & 0 & 5 \\ 1 & 3 & 2 & 4 & 4 \\ 2 & 6 & 4 & 8 & 8 \end{bmatrix} \quad B = \begin{bmatrix} 1 & 3 & 0 & -4 & 6 \\ 0 & 0 & 1 & 4 & -1 \\ 0 & 0 & 0 & 0 & 0 \end{bmatrix}$$