Quiz 9, Linear

Name: _____

1. (4 points) A homogeneous system of nine linear equations in six unknowns has two fixed solutions that are not scalar multiples of one another, and all other solutions are linear combinations of these two solutions. Can the set of all solutions be described with fewer than nine homogeneous linear equations? If so, how many?

2. (1 point) Is the following statement true or false? Explain your reasoning. "If $\dim V = p$, then there exists a spanning set of $p + 1$ vectors in V."

3. (3 points) (a) Is $\begin{bmatrix} 2 \\ 1 \end{bmatrix}$ an eigenvector for $\begin{bmatrix} 4 & -2 \\ -3 & 9 \end{bmatrix}$? Show your work.

   (b) Is 10 an eigenvalue for $\begin{bmatrix} 4 & -2 \\ -3 & 9 \end{bmatrix}$? Show your work.

4. (2 points) Determine the dimensions of Nul A and Col A for $A = \begin{bmatrix} 1 & 0 & 9 & 1 & 2 \\ 0 & 0 & 1 & -4 & 7 \end{bmatrix}$.

Extra Credit(1 point): By inspection, find a nonzero vector in Nul A, where $A = \begin{bmatrix} 1 & 0 & 9 & 1 & 2 \\ 0 & 0 & 1 & -4 & 7 \end{bmatrix}$.