Math 214 - April 17, 2020

Quiz 8-Take Home (Sections 4.6, 5.1)
Due by Sunday 4/19/2020 by 11:59 pm.

Name: ____________________________________

Directions: Complete the following quiz on paper. Show all work necessary to receive full credit. Circle your final answer. Please upload a PDF copy of your responses to Moodle by Sunday, April 19, 2020, by 11:59 pm.

1. Consider $A = \begin{bmatrix} 2 & -3 & 6 & 2 & 5 \\ -2 & 3 & -3 & -3 & -4 \\ 4 & -6 & 9 & 5 & 9 \\ -2 & 3 & 3 & -4 & 1 \end{bmatrix}$. Find a basis for $\text{Col}(A),\ \text{Row}(A),\ \text{Nul}(A)$, and list the $\text{rank}(A)$ and $\dim(\text{nul}(A))$.

2. Let A be an $m \times n$ matrix. Which of the subspaces $\text{Row}(A)$, $\text{Col}(A)$, $\text{Nul}(A)$, $\text{Row}(A^T)$, $\text{Col}(A^T)$, and $\text{Nul}(A^T)$ are in $\mathbb{R}^m$ and which are in $\mathbb{R}^n$? How many distinct subspaces are in this list?

3. Is $\begin{bmatrix} -1+\sqrt{2} \\ 1 \end{bmatrix}$ an eigenvector of $A = \begin{bmatrix} 2 & 1 \\ 1 & 4 \end{bmatrix}$.

4. Consider $A = \begin{bmatrix} 4 & -1 & 6 \\ 2 & 1 & 6 \\ 2 & -1 & 8 \end{bmatrix}$. Show that $\lambda = 2, 9$ are an eigenvalues of A, find corresponding eigenvectors, and find a basis for the corresponding eigenspaces.