Linear Algebra
Quiz 5

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. How do you define the ***rank*** of a matrix?

The ***rank*** of A is the dimension of the column space of A.

2. Find a basis for the subspace spanned by the following vectors.

$$\begin{bmatrix} 1 \\ -1 \\ -2 \\ 3 \end{bmatrix}, \begin{bmatrix} 2 \\ -3 \\ -1 \\ 4 \end{bmatrix}, \begin{bmatrix} 0 \\ -1 \\ 3 \\ -2 \end{bmatrix}, \begin{bmatrix} -1 \\ 4 \\ -7 \\ 7 \end{bmatrix}, \begin{bmatrix} 3 \\ -7 \\ 6 \\ -9 \end{bmatrix}.$$

Applying G. J. Elim. to $A = \begin{bmatrix} 1 & 2 & 0 & -1 & 3 \\ -1 & -3 & -1 & 4 & -7 \\ -2 & -1 & 3 & -7 & 6 \\ 3 & 4 & -2 & 7 & -9 \end{bmatrix}$ yields $\begin{bmatrix} 1 & 0 & -2 & 0 & \frac{15}{2} \\ 0 & 1 & 1 & 0 & \frac{-7}{2} \\ 0 & 0 & 0 & 1 & \frac{-5}{2} \\ 0 & 0 & 0 & 0 & 0 \end{bmatrix}$, with red entries indicating pivots. The result indicates that the 1rst, 2nd and 4rth columns of A form a basis for the space spanned by the 5 vectors.