Math 244 Quiz 1

Names: _____

1. Give an example of a system of 3 (nonzero) equations with 4 unknowns which has a solution with exactly 2 parameters.

2. What is the largest possible rank of an $m \times n$ matrix? What is the smallest possible rank?

3. Give an example of a 3×3 rank 2 matrix that does not contain any 0's.

4. Let $A = \begin{bmatrix} 2 & 0 & 0 \\ -2 & 3 & 0 \\ -1/2 & 0 & 3 \end{bmatrix}$. Show that $\mathbf{x} = \begin{bmatrix} 2 \\ 4 \\ 1 \end{bmatrix}$ is a solution to the matrix equation $A\mathbf{x} = 2\mathbf{x}$.

5. Let A^{-1} be the inverse to A. Explain why $(ABA^{-1})^5 = AB^5A^{-1}$.

6. If $A = \begin{bmatrix} 1 & 0 & 1 \\ 1 & 1 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 1/2 & 0 \\ -1 & 1 \\ 1/2 & 0 \end{bmatrix}$, then it can be shown that $AB = I_2$. Does A^{-1} exist?