Name:_____ Math 260
Start Time:_____ Quiz 5 (40 min)
End Time:_____
Date:_____

1. (1 point) Complete the following definition:

Definition: The square matrix A is <u>invertible</u> if…

2. (2 points) Prove the uniqueness of the inverse of a matrix. That is, prove the following statement:

If B and C are inverses of a square matrix A, then $B = C$.

3. (2 points) Use the matrix inversion algorithm to find A^{-1} if $A = \begin{bmatrix} 3 & 1 & -1 \\ 2 & 1 & 0 \\ 1 & 5 & -1 \end{bmatrix}$ (calculator OK!)

4. (3 points) Write $A = \begin{bmatrix} 2 & 5 \\ -3 & -2 \end{bmatrix}$ as a product of elementary matrices.

5. (2 points) Give an example of a square matrix that is not invertible and explain why it is not invertible

Extra Credit

1. (2 points) Prove: If A and B are $n \times n$ invertible matrices, then AB is invertible and $(AB)^{-1} = B^{-1}A^{-1}$

2. (2 points) Prove: If A is an $n \times n$ invertible matrix, then A^T is invertible and $(A^T)^{-1} = (A^{-1})^T$

3. (4 points) True or False? (For each of the following, assume A and B are square matrices of the same size)

a) If A is an invertible matrix, then when reducing it to reduced row-echelon form, you get the identity matrix.

b) If the matrix A has a right inverse, then it is invertible.

c) If the system of equations $A\vec{x} = \vec{b}$ has a solution for any choice of $\vec{b}$ then A has an inverse.

d) If A and B are invertible then so is $A + B$