

Name: _____

Score: _____

Directions: Please answer the questions in the space provided. To get full credit you must show all of your work. Use of calculators and other computing or communication devices is **not** allowed on this test.

1. (25 points) For this problem, $A = \begin{bmatrix} 2 & 3 & -1 \\ 1 & 5 & 5 \end{bmatrix}$, $B = \begin{bmatrix} 2 & -1 \\ -2 & 1 \end{bmatrix}$, $C = \begin{bmatrix} -2 \\ 4 \end{bmatrix}$, and $D = \begin{bmatrix} -2 & 0 \end{bmatrix}$.

Perform the indicated operations or state that they are not possible.

(a) $BA =$

(b) $A^T C =$

(c) $B^{-1} =$

(d) $CD =$

(e) Solve the equation $X - 3B + 2I_2 = O$ for X .

2. (15 points) Suppose A, B and C are invertible matrices. Solve the equation $AXC = CB$ for X .

3. (15 points) Find the inverse of the matrix $A = \begin{bmatrix} 3 & 5 & 5 \\ 1 & 2 & 2 \\ 0 & 1 & 2 \end{bmatrix}$.

4. (15 points) Find A , given that $(2A)^{-1} = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$.

5. (15 points) Factor the matrix $A = \begin{bmatrix} 1 & 2 \\ 1 & 0 \end{bmatrix}$ into a product of elementary matrices.

6. (15 points) Find an LU factorization of the matrix $A = \begin{bmatrix} 3 & 0 & 1 \\ 6 & 1 & 1 \\ -3 & 1 & 0 \end{bmatrix}$.