Math 251 X02
Test Two

Time: 50 minutes
Total: 25 marks

Name: _____

1. [5 marks] Write $C = \begin{bmatrix} 7 & 83 \\ 94 & -179 \end{bmatrix}$ as a linear combination of $A = \begin{bmatrix} 1 & 2 \\ -3 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 5 \\ 2 & -5 \end{bmatrix}$, or show that it is not possible to do so.

2. [3 marks] We want to balance the following chemical equation. Set up a system of equations. Do not solve the system.

$$NH_3 + O_2 \rightarrow NO + H_2O$$

3. [7 marks] Let $A = \begin{bmatrix} 3 & -2 \\ 6 & 4 \end{bmatrix}, B = \begin{bmatrix} 2 & -2 \\ 8 & 3 \end{bmatrix}$ and $C = \begin{bmatrix} 7 & 4 \\ -5 & 7 \end{bmatrix}$.

Compute $(A - 2I)B^T + C^2$.

4. [5 marks] Find the general form of span($\begin{bmatrix} 1 \\ 0 \\ 3 \\ 2 \end{bmatrix}$, $\begin{bmatrix} 3 \\ 1 \\ 9 \\ 12 \end{bmatrix}$).

5. [5 marks] Write $A = \begin{bmatrix} 1 & 4 \\ -3 & 6 \end{bmatrix}$ as a product of elementary matrices.