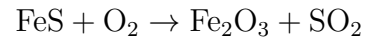


Math 251 X02
Test Two

Time: 50 minutes
Total: 25 marks

Name: _____

1. [3 marks] Write down the system of equations you would solve to balance the following chemical equation. **Do not solve the system.**



2. [5 marks] If possible, write $\mathbf{w} = \begin{bmatrix} 51 \\ 183 \\ 267 \end{bmatrix}$ as a linear combination of

$\mathbf{u}_1 = \begin{bmatrix} 1 \\ -2 \\ 3 \end{bmatrix}$ and $\mathbf{u}_2 = \begin{bmatrix} 2 \\ 1 \\ 8 \end{bmatrix}$. Show all your work.

3. [6 marks] Let $A = \begin{bmatrix} 2 & -3 \\ 1 & 4 \end{bmatrix}$, $B = \begin{bmatrix} 1 & -6 \\ 8 & 4 \end{bmatrix}$ and $C = \begin{bmatrix} 3 & 4 \\ -5 & 1 \end{bmatrix}$.
Compute $(A + 7I)^T - BC$.

4. [6 marks] a) Find A^{-1} for $A = \begin{bmatrix} 7 & -2 \\ 3 & 5 \end{bmatrix}$.

b) Solve the system below. Your answer will involve the constant c .

$$7x - 2y = 157$$

$$3x + 5y = c$$

5. [5 marks] Find the general form of $\text{span}\left(\begin{bmatrix} 1 \\ 2 \\ 4 \end{bmatrix}, \begin{bmatrix} 6 \\ 14 \\ 30 \end{bmatrix}\right)$.