MATH 316 Quiz 4 NAME:

1.(3pts) Show that the linear transformation $T: R^{2\times 2} \to R^{2\times 2}$ defined by $T(A) = \begin{bmatrix} 2 & 6 \\ -1 & -3 \end{bmatrix} A$ is not an isomorphism.

2.(4pts) Are the following matrices linearly independent or linearly dependent? Explain your answer in detail:

$$\begin{bmatrix} 1 & 1 \\ 0 & 0 \end{bmatrix}, \quad \begin{bmatrix} 0 & -1 \\ 1 & 2 \end{bmatrix}, \quad \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}, \quad \begin{bmatrix} 0 & 0 \\ 1 & 1 \end{bmatrix}.$$

3.(3pts) Compute the determinant of $\begin{bmatrix} 1 & 0 & -1 \\ 2 & 3 & 4 \\ -2 & 0 & -1 \end{bmatrix}$ by Sarrus's rule.

Bonus:(2pts) Find the determinant of the following matrix using the definition of the determinant:

$$\begin{bmatrix} 0 & 0 & 2 & 3 & 1 \\ 0 & 0 & 0 & 2 & 2 \\ 0 & 9 & 7 & 9 & 3 \\ 0 & 0 & 0 & 0 & 5 \\ 3 & 4 & 5 & 8 & 5 \end{bmatrix}$$