MATH 201: Linear Algebra – Quiz 2A

NAME: _____ ID Number: _____

Problem 1. Which of the following matrices are invertible?

$$A = \begin{bmatrix} 1 & 3 \\ 2 & 6 \end{bmatrix} \qquad B = \begin{bmatrix} 1 & 0 \\ 0 & 2 \end{bmatrix} \qquad C = \begin{bmatrix} 1 & 2 & 3 \\ 0 & 1 & 1 \\ 1 & 3 & 4 \end{bmatrix}.$$

Problem 2. Find the inverse of the matrix $A = \begin{bmatrix} 1 & 2 \\ 0 & 1 \end{bmatrix}$.

Problem 3. Suppose that $ABAC = \mathrm{Id}$ for square matrices A, B, C. Write B in terms of A and C.

Problem 4. Write a set of vectors which span the image of $A = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}$.

Problem 5. Let $T : \mathbb{R}^2 \to \mathbb{R}^2$ represent rotation by 45°. Let $S : \mathbb{R}^2 \to \mathbb{R}^2$ represent reflection across the x-axis.

(a) Find A such that $(T \circ S)(\vec{x}) = A\vec{x}$.

(b) Find B such that $(T \circ S)^{-1} \vec{x} = B\vec{x}$.