Quiz 2 Math 54-Lec 3, Linear Algebra, Fall 2017

> You have 30 minutes to complete this quiz. To receive full credit, you must justify your answers.

Problem 1.(5 points.) Compute the matrix product AB for A, B below.

$$A = \begin{bmatrix} 4 & -3 \\ -3 & 5 \\ 0 & 1 \end{bmatrix}, B = \begin{bmatrix} 1 & 4 \\ 3 & -2 \end{bmatrix},$$

Problem 2.(5 points.) Let $T : \mathbb{R}^3 \to \mathbb{R}^3$ be a linear transformation such that

$$T\left(\begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix}, \right) = \begin{bmatrix} x_1 \\ x_2 \\ -x_3 \end{bmatrix}.$$

Verify that T is linear.

Problem 3.(5 points.) Let $S : \mathbb{R}^p \to \mathbb{R}^n$ and $T : \mathbb{R}^n \to \mathbb{R}^m$ be one-to-one, linear transformations. Prove that the composition of T and S, $T(S(\vec{x}))$, sometimes written $(T \circ S)$, is also one-to-one.