MATH 54 − QUIZ 4

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Name:_____

Instructions: You have 15 minutes to take this quiz, for a total of 10 points. May your luck form a vector space!

1. *(4 points)* Recall that a matrix A is symmetric if and only if $A^T = A$. Does the set of $n \times n$ symmetric matrices (with real entries) form a vector space? Justify **carefully** (= the way I did it in section).

2. *(2 points)* Is the following set W a subspace of $\mathbb{R}^2$? Justify **briefly** (= 1 sentence max).

$$W = \left\{ (x, y) \in \mathbb{R}^2 \,|\, x^2 + y^2 = 0 \right\}$$

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3. *(4 points)* Find an explicit description of $Nul(A)$ by writing it as the Span of some vectors, where A is the following matrix:

$$A = \begin{bmatrix} 1 & 1 & -3 & 7 & 9 & -9 \\ 1 & 2 & -4 & 10 & 13 & -12 \\ 1 & -1 & -1 & 1 & 1 & -3 \\ 1 & -3 & 1 & -5 & -7 & 3 \\ 1 & -2 & 0 & 0 & -5 & -4 \end{bmatrix} \sim \begin{bmatrix} 1 & 1 & -3 & 7 & 9 & -9 \\ 0 & 1 & -1 & 3 & 4 & -3 \\ 0 & 0 & 0 & 1 & -1 & -2 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$$