Quiz 5: November 6

Name: _____

SID: _____

Problem 1. Let $T : \mathbb{R}^3 \to \mathbb{R}^3$ be given by the matrix

$$\begin{bmatrix} 1 & 0 & 1 \\ 0 & 2 & 1 \\ 0 & 0 & 2 \end{bmatrix}$$

Compute a basis for the generalized eigenspace $G(2, T)$.

Problem 2. Suppose T is an operator on $\mathbb{R}^2$ such that $T^2 = I$. Prove that T is diagonalizable.

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Compute a basis for the generalized eigenspace $G(2, T)$.

Problem 2. Suppose T is an operator on $\mathbb{R}^2$ such that $T^3 = 0$ and T is diagonalizable. Show that T must be the 0 map.

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Problem 1. Let $T : \mathbb{R}^2 \to \mathbb{R}^2$ be given by

$$T(x, y) = (x - y, -x + y)$$

what is the minimal polynomial for T?

Problem 2. Suppose T is an operator on $\mathbb{R}^2$ such that $T^2 = I$ and $T^2 + T - 2I = 0$. Show that T is the identity.