

MATH 201: Linear Algebra – Quiz 4

NAME: _____

ID Number: _____

Problem 1. Let P_2 denote the set of polynomials of degree at most 2. Consider the function $T : P_2 \rightarrow P_2$ defined by

$$T(p(x)) = -p(x).$$

Is T an isomorphism? That is, is T an invertible, linear map?

Problem 2. Give two different bases \mathcal{B} and \mathcal{B}' for the linear space P_2 . Write a matrix A such that

$$A[\vec{x}]_{\mathcal{B}} = [\vec{x}]_{\mathcal{B}'}$$

Problem 3. Let $\vec{u} = \begin{bmatrix} 0 \\ 1 \end{bmatrix}$ and $\vec{v} = \begin{bmatrix} 3 \\ 4 \end{bmatrix}$.

- (a) Compute the **orthogonal projection** of \vec{v} onto the line spanned by \vec{u} .
- (b) Compute the component of \vec{v} orthogonal to $\text{span } u$.