

Linear Algebra
Quiz 5

Name: _____

You have 10 minutes to complete this quiz. If you have a question raise your hand and remain seated. In order to receive full credit your answer must be **complete**, **legible** and **correct**. Show your work, and give adequate explanations.

1. Define what it means for vector spaces V and W to be isomorphic.

V is isomorphic to W if there is a linear transformation $T: V \rightarrow W$ that is invertible.

2. Let $\mathcal{B} = (1, t, t^2)$ and let $\mathcal{C} = (-1 + t + t^2, 1 - t + t^2, 1 + t - t^2)$.
 - (1) Write the vectors in \mathcal{C} in the \mathcal{B} -basis for the space $\mathbb{P}_2(t)$.

$$\mathcal{C} = \left(\left(\begin{bmatrix} -1 \\ 1 \\ 1 \end{bmatrix}, \begin{bmatrix} 1 \\ -1 \\ 1 \end{bmatrix}, \begin{bmatrix} 1 \\ 1 \\ -1 \end{bmatrix} \right) \right)$$

- (2) Is \mathcal{C} a basis for $\mathbb{P}_2(t)$? (Explain.)

Yes. One can check that the vectors in \mathcal{C} are a basis by showing that $[\mathcal{C}]_{\mathcal{B}\mathcal{B}} = I$ (a pivot in every row and column).