

Math 205 Quiz 5

Name:

1. Let $\beta = \{1, 2 - t, t^2 + t^3, t^3\}$ be a basis for \mathbb{P}_3 . Suppose you are given the following coordinate vector:

$$[\vec{p}(t)]_\beta = \begin{bmatrix} 2 \\ 1 \\ 3 \\ -1 \end{bmatrix}$$

What is $\vec{p}(t)$?

2. Let $\Delta = \{1 + t, 2t, t + t^2, t^3\}$ be a basis for \mathbb{P}_3 . What is the coordinate vector for the vector $\vec{p}(t) = 1 + 4t + 3t^2$?

3. Determine whether the vectors $\{1 + 2t^2, 4 + t, t + 5t^2\}$ in \mathbb{P}_2 are linearly independent or linearly dependent by using a coordinate vector argument.

4. $B = \begin{bmatrix} 3 & 1 & 2 & 3 \\ 0 & -2 & 4 & 8 \\ 12 & 18 & 8 & 4 \end{bmatrix}$

(a) What is the dimension of the $\text{Col}(B)$? How do you know?

(b) What is the dimension of the $\text{Nul}(B)$? How do you know?

(c) The $\text{Nul}(B)$ is a subspace of \mathbb{R}^k . What is k ?

(d) The $\text{Col}(B)$ is a subspace of \mathbb{R}^p . What is p ?