

MATH 2130 LINEAR ALGEBRA
HOMEWORK 8
DUE 2025 OCTOBER 19

PROBLEM 1 (P5)

Is the function $f: \mathcal{P}_2 \rightarrow \mathbb{R}^3$ given by

$$f(ax^2 + bx + c) = (a - b, b - c, a - c)$$

an isomorphism? Either prove that it is or show that one of the conditions fails.

PROBLEM 2 (S6)

Evaluate

$$\begin{bmatrix} 0 & 1 & 2 \\ 2 & 1 & 0 \\ 3 & 4 & 3 \end{bmatrix} \begin{bmatrix} 3 & 5 & -2 \\ -6 & -6 & 4 \\ 5 & 3 & -2 \end{bmatrix}.$$

PROBLEM 3 (S6)

Evaluate

$$\begin{bmatrix} 0 & 1 & 2 \\ 2 & 1 & 0 \\ 3 & 4 & 3 \end{bmatrix}^2.$$

PROBLEM 4 (S6)

Evaluate

$$\begin{bmatrix} 0 & 1 & 2 \\ -1 & 1 & 1 \\ 0 & 2 & 1 \end{bmatrix}^3.$$

PROBLEM 5 (S6)

Evaluate

$$\begin{bmatrix} 0 & 1 & 2 \\ -1 & 1 & 1 \\ 0 & 2 & 1 \end{bmatrix} \begin{bmatrix} 1 & -10 & -6 \\ -1 & -2 & 9 \\ 2 & 4 & 0 \end{bmatrix}.$$