

Answer the questions below. You may answer in the space provided. You may use a separate sheet of paper if you need more space. You are to work in groups of no more than four people. Make sure to enter the names of your groupmates below.

Name: _____

Section: _____

Group Members: _____

1. Let $L : M^{2,2} \mapsto M^{2,2}$ where

$$L \left(\begin{bmatrix} a & b \\ c & d \end{bmatrix} \right) = \begin{bmatrix} a+b & b+c \\ a+d & b+d \end{bmatrix}.$$

(a) (5 points) Find a basis of $\ker L$.

(b) (5 points) Find a basis for $L(V)$.

2. (10 points) Let $L : \mathcal{P}_1 \mapsto \mathcal{P}_2$ where $L(p(x)) = xp(x) + p(0)$. Let $B = \{x + 1, x - 1\}$ and $C = \{x^2 + 1, x - 1, x + 1\}$ be bases of \mathcal{P}_1 and \mathcal{P}_2 , respectively. Find $[L]_{C \leftarrow B}$.