

MATH 117: Daily Assignment 7

WRITE YOUR NAME HERE

August 14, 2023

See the [daily assignment webpage](#) for due dates, templates, and assignment description. Try to explain your reasoning and justify your computations for every problem. You should not appeal to any theorems that we have not proved yet.

1. Let $V = F^2$ where $F = \mathbb{Z}_5$. Denote the elements of \mathbb{Z}_5 by $0, 1, 2, 3, 4$. A basis for V is given by $B = ((1, 2), (1, 0))$. Define a linear map $L : V^* \rightarrow V^*$ as follows: for any linear functional $f \in V^*$, $L(f)$ is the linear functional satisfying $L(f)(a, b) = f(a + 3b, 4b)$. Let B^* denote the dual basis of B .
 - (a) Compute $[L]_{B^*}^{B^*}$ using only the definitions and Theorem 3.1.4.
 - (b) Compute $[L]_{B^*}^{B^*}$ using Theorem 3.2.2.¹. Make sure you get the same result as in (a).

¹You have to find a linear map $K : V \rightarrow V$ such that $K^* = L$ in order to invoke the theorem