

## 240Algebra-121025, Hour 21: Term Test

October-25-12  
1:35 PM

Dror's grading key:

**Problem 5.** Let  $V$  and  $W$  be vector spaces over the same field  $F$ , and let  $u$  be some element of  $V$ . Recall that  $\mathcal{L}(V, W)$  denotes the vector space of all linear transformations  $L: V \rightarrow W$ .

13 Nov 1. Define a map  $E: \mathcal{L}(V, W) \rightarrow W$  by setting  $E(L) = L(u)$ , for  $L \in \mathcal{L}(V, W)$ . Prove that  $E$  is a linear transformation.

12 Nov 2. If in addition  $V$  is of dimension 1 and  $u \neq 0$ , prove that  $E$  is an isomorphism.