

Math 129b, problem set 06
Clarification on problem 5

5. Let $L : U \rightarrow V$ and $T : V \rightarrow W$ be linear, and assume that U , V , and W are pairwise disjoint (i.e., $U \cap V = \emptyset$, $U \cap W = \emptyset$, $V \cap W = \emptyset$). Label each of the following statements “true for all such T and L ,” “true for some such T and L and false for other such T and L ,” or “false for all such T and L .” Justify/prove each answer.

(a) $\ker T \subseteq \ker T \circ L$.

(b) $\ker L \subseteq \ker T \circ L$.

(c) $\operatorname{im} T \circ L \subseteq \operatorname{im} T$.

(d) $\operatorname{im} T \circ L \subseteq \operatorname{im} L$.