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1. Let  $L : U \rightarrow U$  be a linear transformation. The *spectrum*  $\mathcal{S}(L)$  of  $L$  is the set of eigenvalues of  $L$ . Show that  $\mathcal{S}(L + \mu I) = \mathcal{S}(L) + \{\mu\}$  for all  $\mu \in \mathbf{F}$ .

2. Let  $L : U \rightarrow U$  be a linear transformation. Recall that a subspace  $W$  of  $U$  is  $L$ -invariant if  $L(W) \subseteq W$ . Let  $\mu$  be a scalar. Show that a subspace  $W$  of  $U$  is  $(L + \mu I)$ -invariant if and only if  $W$  is  $L$ -invariant.