Homework 9

1. Suppose T is a linear transformation on V such that every vector in V is an eigenvector of T. Prove that T is a scalar multiple of the identity linear transformation.

2. Prove that if V is a complex inner product space, then

$$< u, v >= \frac{||u+v||^2 - ||u-v||^2 + ||u+iv||^2 i - ||u-iv||^2 i}{4}$$

for all $u, v \in V$.