Assignment 8 – Part 1 – Math 411

(1) Let V be a vector space over F, let $\alpha \in F$, and let $T_\alpha : V \to V$ be the linear transformation $v \mapsto \alpha v$. Prove the following properties we discussed in class.

(a) $T_0 = 0$.

(b) $T_1 = 1$.

(c) $T_{\alpha_1+\alpha_2} = T_{\alpha_1} + T_{\alpha_2}$.

(d) $T_{\alpha_1\alpha_2} = T_{\alpha_1} T_{\alpha_2}$.

(Remark: these show that F can be thought of as a "subalgebra" of $\mathrm{End}(V)$.)