Math 494, Homework 1: due Jan 21

(1) Let End($S_3$) be the set of homomorphisms from the group $S_3$ to itself. For $u, v \in \text{End}(S_3)$, define $u \cdot v$ to be the function $S_3 \to S_3$ which maps $g \mapsto u(g)v(g)$. Show that there exist $u, v \in \text{End}(S_3)$ for which $u \cdot v$ is not in End($S_3$).

(Note: it was shown in class that this cannot happen in End($G$) when $G$ is an abelian group.)

(2) Problems 1.3, 1.6, 1.7, 3.3, 3.8, 3.10, 3.12, 3.13 from chapter 11 of Artin.