

**Homework # 8- Due Tuesday 2/7/06, Assigned Thursday
2/2/06**

1. Prove that the intersection of two normal subgroups of G is normal.
(You already proved it was a subgroup on the previous assignment)
2. The *center* $Z(G)$ of a group is defined to be the elements in G which commute with every element of G :

$$Z(G) = \{z \in G \mid zg = gz \forall g \in G\}.$$

For example if G is abelian then $Z(G) = G$ and if $G = S_3$ then $Z(G) = \{e\}$. Prove that $Z(G)$ is a subgroup and that it must be normal.