Math 481 - Graded Problems #3 Name: _____
Fall 2013 - Nathan Reff

1. Suppose G is a group, and let $g \in G$. Let $\varphi_g : G \to G$ be a function defined by $\varphi_g(x) = gxg^{-1}$. Show that φ_g is an automorphism of G.

2. Let G be an abelian group. Let $f : G \to G$ be a function defined by $f(x) = x^{-1}$.

   (a) Show that f is an automorphism of G.

   (b) Show that if $G = S_3$, then f is not an automorphism.

   (c) Show that if G is non-abelian, then f is not an automorphism.

3. Let $\varphi : G \to G$ be an automorphism. Let $H := \{x \in G \mid \varphi(x) = x\}$. Show that $H \leq G$.