6. TRUE or FALSE. (If true, PROVE it. If false, give a COUNTER EXAMPLE.) Let G be a group and let a be a fixed element of G. If $\gamma_a\colon G \to G$, is the function which is given by $\gamma_a(g) = a^{-1}ga$ for all $g \in G$, then γ_a is a permutation of the set G.

True <u>1-1</u> suppose $\gamma_a(g_1) = \gamma_a(g_2)$ then $a^{-1}g_1a = a^{-1}g_2a$ multiply by a (on the left) and a^{-1} (on the right) to get $g_1 = g_2$

<u>onto</u> take $g \in G$ observe that $\gamma_a(aga^{-1}) = a^{-1}aga^{-1}a$ $= g$

7. TRUE or FALSE. (If true, PROVE it. If false, give a COUNTER EXAMPLE.) Let G be a group and let a be a fixed element of G. If $\rho_a\colon G \to G$, is the function which is given by $\rho_a(g) = ga$ for all $g \in G$, then ρ_a is a group homomorphism.

False ρ_a is not a group homomorphism because $\rho_a(e) = a$ but a group homomorphism always carries ~~the~~ identity to the identity