Let $G$ be a group and let $a \in G$ be a fixed element. Define $\rho_a : G \to G$ by the rule $\rho_a(g) = ga$ for all $g \in G$, i.e. $\rho_a$ multiplies what goes into it on the right by $a$.

Define $K = \{ \rho_a : a \in G \}$ to be the set of all these $\rho$'s.

A. Let $x \in G$ be arbitrary. One element of $G$ that $\rho_a$ sends to $x$ is ____________.

B. Part A proves that $\rho_a$ is ____________________________.

C. Let $x, y \in G$ and $\rho_a(x) = \rho_a(y)$. Prove that $x = y$.

__________________________________________

__________________________________________

D. Part C proves that $\rho_a$ is ____________________________.

E. A function from $G$ to $G$ that has the properties from parts B and D is called

a ____________________________ of $G$.

[the answer starts with P]

F. If $\rho_a$ is composed with $\rho_b$ then the function $\rho_a \circ \rho_b$ is an element of $K$, i.e. equals $\rho_c$ for some $c \in G$. The $c$ that gives $\rho_a \circ \rho_b$ is ________________.

G. Show that if $e$ is the identity element of $G$, then $\rho_e$ is the identity permutation of $G$.

__________________________________________

H. The answer to part E assures us that $\rho_a$ has an inverse for every $a \in G$, i.e. is of the form $\rho_c$. The $c$ that gives the inverse for $\rho_a$ is ________________.

I. We call a set with an operation that satisfies F, G, and H a ____________________________.