Suppose $<G,*>$ and $<G',*>$ are groups and that $\phi: G \rightarrow G'$ is a homomorphism.

Let $K = \{x \in G \mid \phi(x) = e'\}$, where $e'$ is the identity element of $G'$. [Something is an element of $K$, if $\phi$ sends it to $e'$.]

A. If $e$ is the identity element of $G$, show that $e \in K$. [Consider $\phi(e*e)$.]

B. Show that if $x, y \in K$ then $x*y \in K$. [Consider $\phi(x*y)$.]

C. Show that if $x \in K$ then $x^{-1} \in K$. [Consider $\phi(x*x^{-1})$.]

D. From A, B, and C we can conclude that $K$ is ______________________________.

E. Show that if $x \in K$ and $g \in G$ then $g^{-1}*x*g \in K$. [Consider $\phi(g^{-1}*x*g)$.]