

Q8: If G is abelian, then we have that $G' = e$ since we can commute elements of the form

$$ghg^{-1}h^{-1} = gg^{-1}hh^{-1} = e$$

Therefore $G/G' = G/\{e\}$. If we define $\phi : G \rightarrow G$ by $\phi(g) = g$, the kernel is clearly e . Hence by the first isomorphism theorem there is an isomorphism $\tilde{\phi} : G/\{e\} \rightarrow G$ which sends elements of the form $g\{e\}$ to g . Hence if G is abelian we have that $G \cong G/G'$