MORE CORRESPONDENCES – PRACTICE

Theorem: Let G be a group, N a normal subgroup of G, and let M be a subgroup of G/N that contains N. Also, define $f : G \to G/N$ by $f(g) = Ng$, and define $f^{-1} : G/N \to G$ by $f^{-1}(Ng) = \{g \in G \mid f(g) \in Ng\}$. Similarly, for any set $A \subseteq G/N$ let $f^{-1}(A) = \{g \in G \mid f(g) \in A\}$. Then if M is a normal subgroup of G/N, $f^{-1}(M)$ is a normal subgroup of G.

Proof: