1. Let $G$ be a group, $N \trianglelefteq G$ and $A \leq G$. Suppose that $A \cap N = \{e\}$ and $G/N$ is abelian. Show that $A$ is abelian.
2. Find all elements of the subgroup \( \langle (13)(25), (14)(25) \rangle \) of Sym(5).
3. Let $G$ be a group and $N \trianglelefteq G$. Suppose that $G/N$ has exactly five subgroups of order 9. Show that there exist exactly five subgroup $F$ of $G$ such that $N \leq F$ and $|F/N| = 9$. 
4. Let \( G \) be a group and \( N \trianglelefteq G \). Let \( x \in G \) and put \( M = xN \). Show that the map
\[
\alpha : G/N \to G/M, \, gN \mapsto xgM
\]
is a well-defined isomorphism.
5. Let $A$ and $B$ be subgroups of $\text{Sym}(5)$ with $|A| = 24$ and $|B| = 10$. Show that $\langle A, B \rangle = \text{Sym}(5)$. 
