Each of these problems are model questions with many possible variants, each based on groups of small order. On the actual exam, specific choices for $G$ and $H$ will be given.

In addition, please consult last year’s first exam for Modern Algebra I.

[1] Let $H$ be a (specific) subgroup of a (specific) group of order order $\leq 12$. What are the right cosets of $H$ in $G$?

[2] Let $H$ be a (specific) subgroup of a (specific) group of order order $\leq 12$. Is $H$ a normal subgroup of $G$? What are the conjugate subgroups $gHg^{-1}$ of $H$ in $G$?

[3] Let $G$ be a (specific) group of order order $\leq 12$. List the subgroups of $G$, and draw the lattice of subgroups by inclusion. Which subgroups are normal? What are the corresponding quotient groups? ($G$ will be specified on the exam.)

[4] Let $G$ and $H$ be (specific) groups of order order $\leq 12$. How many group homomorphisms can you find from $G$ to $H$? For each homomorphism, what is the kernel subgroup in $G$? What is the image subgroup in $H$?