1. Let $p > 3$ be a prime number. Show that any group of order $3p$ is solvable.


3. Show that no group of order 64 or 96 is simple. Construct two distinct non-abelian groups of each order.


5. Show that no group of order 112 is simple. (Hint: if the group $G$ is simple then it admits an injective homomorphism to the symmetric group $S_r$, where $r$ is the number of 2-Sylow subgroups.)

**Recommended reading**

Gallagher notes 22, 23, 24.