1. Read the beginning of Section 4.6 on semidirect products (through Lemma 4.6.4). This shows how to create a different group operation on a direct product by using a group action. Use the semidirect product construction to construct a nonabelian group of order $pq$, where $p, q$ are prime numbers with $q \equiv 1 \mod p$.

2. Let $G$ be a finite group with $P$ a Sylow $p$-subgroup. Show that $N_G(P)$ is its own normalizer.


4. A simple group is a group with no nontrivial normal subgroups. Show that there are no simple groups of order 148 or of order 56.

5. Steinberger, p. 147, Problem 7.