# Worksheet 13

1. We showed that if $G$ is a finite group and $g \in G$, then $\text{order}(g) \mid \#G$. However, it is *not* true that if $d \mid \#G$, then $\exists g \in G$ such that $\text{order}(g) = d$. Find a counterexample.

2. Define an equivalence relation on $D_8$ by $g \sim h$ if and only if $g^{-1}h \in \langle \sigma \rangle$. Determine the equivalence classes for this relation.