This is a short homework! The midterm will be held February 12 in class. I posted a practice midterm exam; the solution will be discussed in the discussion session on February 11.

1. Biggs 13.7 # 3 page 288
Show that if $H$ and $K$ are subgroups of $G$ then so is $H \cap K$.

2. Biggs 13.10 # 13 page 298
Let $H$ and $K$ be subgroups of a finite group $G$ such that $\gcd(|H|, |K|) = 1$. Show that $|H \cap K| = 1$.

3. Biggs 13.10 # 5 page 297
Show that if $H$ is a subgroup of index 2 in a group $G$ then the left coset $gH$ is the same as the right coset $Hg$ for all $g \in G$. 