Math 421 – Spring 2014
Homework 8

1. Prove that a group of order 33 is abelian.
2. Determine the Sylow 2-subgroups of S_3. Then determine the Sylow 3-subgroups of S_3.
3. What are the possible number of Sylow 2-subgroups of a group of order 24?
4. Show that a group of order 45 has a normal subgroup of order 9.
5. Let G be a finite group and let p divide $|G|$. If H is any p-subgroup of G and P is a Sylow p-subgroup, show that there exists a $g \in G$ such that $g^{-1}Hg \subseteq P$.
6. Show there are no simple groups of order 255.
7. Show that there are no simple groups of order $p^r m$, where p is a prime, r is a positive integer and $m < p$.
8. Let P be a normal p-subgroup of G. Show that P is contained in every Sylow p-subgroup of G.