ASSIGNMENT 5

DUE DATE: NOV 8, 2011

1) If N is a normal subgroup of G, P is a p-Sylow subgroup of G, then PN/N is a p-Sylow subgroup of G/N. 5 points

2) Prove that a group of order 28 with a normal subgroup of order 4 is abelian. 5points

3) An action of a group G on X is said to be transitive if given any two elements x, y in X, there is an element $g \in G$ such that $gx = y$. Give two examples of transitive group actions with full details. 5 points

4) Show that every nonabelian group of order $2p$ where p is a prime is dihedral. 5 points

(Hint: Use Sylow theorems and the fact that in $\mathbb{Z}/p$, if $x^2 = 1$, then $x = \pm 1$.

5) Let G be a noncyclic group of order 21. How many 3-Sylow subgroups does G have?

Prove that G has 14 elements of order 3. 5 points