

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. 5 points
- 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