Math 621   HW #4  (Corrected) – Due Wednesday, March 9.

[8pts] 1. Let $G$ be a group.
   
   (a) Show that if every $a \in G$ satisfies $a^2 = 1$, then $G$ is abelian.
   
   (b) Show that every group of order 5 or less is abelian.

[6pts] 2. Let $N$ be the subset of $S_4$ define as:

   $$N := \{(1), (12)(34), (13)(24), (14)(23)\}.$$  

   Then $N$ is a subgroup of $A_4$ - you do not have to prove this! (The only proof of this I see is brute force.) Show that $N$ is the only non-cyclic subgroup of $A_4$ or order four. Then show that $N$ is a normal subgroup of both $S_4$ and $A_4$.

**Additional Problems:**

Sec. 3.4: 5
Sec. 3.5: 3, 14, 15
Sec. 4.3: 2, 5, 10, 25