Second Exam   **Abstract Algebra I (250342)**   **05/01/2017**

Name: —————————— **Number:** —————————— **Section:** ——————————

Question 1:(8 points)

1. Prove the subgroup $SL(2,\mathbb{R})$ is normal in $GL(2,\mathbb{R})$.

2. Let G be an abelian group. Let $\theta(a) = a^{-1}$ for all a in G. Prove: θ is isomorphism.

Question 2:(6 points)

1. Compute the index $[U_{15} :< 7 >]$.

2. Draw Cayley table for factor group $U_{13}/ < 8 >$.

3. Draw the subgroup lattice for U_{13}.

Question 3: (6 points)

1. How many abelian groups have order 8000?

2. Prove if G abelian order 70, then G is cyclic.

3. Prove true or false? $U_8 \approx U_{12}$.