University of Bahrain
Department of Mathematics
MATHS311: Abstract Algebra 1
Fall 2017
Dr. Abdulla Eid

Homework 7: Normal Subgroups
Due on November 30
Hand all the problems

Name: _____

1. If H, K are normal subgroups of a group G. Prove that $H \cap K$ is a normal subgroup of G.

2. Show that $SL(n, \mathbb{R}) \triangleleft GL(n, \mathbb{R})$.

3. Let H is a subgroup of G. Prove that

$$H \triangleleft G \iff gHg^{-1} = H, \qquad \text{for all } g \in G$$

4. Let $H \triangleleft G$, $K \leq G$. Prove that HK is a subgroup of G. What can you conclude about HK and KH?

5. Is $\text{stab}(2)$ a normal subgroup of S_4?

6. Prove that if $\langle a \rangle \triangleleft G$, then $C(a) \triangleleft G$.