Math 421 Problem Set
September 22, 2022

1. Let G be a group and $H \leq G$.

   (a) Show $H \leq N_G(H)$.

   (b) Show $H \leq C_G(H)$ if and only if H is abelian.

   (c) Let $A \subseteq G$ be a nonempty subset (not necessarily a subgroup). Define

   $$N_H(A) = \{h \in H \mid hAh^{-1} = A\}.$$

   Show that $N_H(A) = N_G(A) \cap H$, and thus $N_H(A)$ is a subgroup of H.