

## MATH 3360 HOMEWORK ASSIGNMENT 9

DUE ON FRIDAY 3 APRIL 2020

- (1) Let  $G$  be a group.
  - (a) Show that for every subgroup  $H$  of  $G$  and every element  $g \in G$  the subset  $gHg^{-1}$  of  $G$  is a subgroup. (Do not refer to the textbook.)
  - (b) Let  $X$  be the set of all subgroups of  $G$ . Show that setting  $g \cdot H := gHg^{-1}$  defines an action of  $G$  on  $X$ .
  
- (2) Determine the set  $X$  of all subgroups of  $U(8)$  and find the orbits of the action of  $U(8)$  on  $X$  defined in Problem (1). Comment on what you find.
  
  
  
  
  
  
  
  
  
  
- (3) Determine the set  $X$  of all subgroups of  $S_3$  and find the stabilizer of every element  $x$  in  $X$ . Comment on what you find.