

## QUIZ 4

- (1) **(5 points)** Show that two elements  $g, h$  in a group  $G$  commute if and only if  $ghg^{-1}h^{-1} = 1_G$ .
- (2) **(3 points)** Let  $H$  and  $K$  be normal subgroups of a group  $G$ . Show that for elements  $h \in H$  and  $k \in K$  that  $hkh^{-1}k^{-1} \in H \cap K$ .
- (3) **(2 points)** Using the first parts, conclude that if the two normal subgroups,  $H$  and  $K$ , intersect only at the identity, then every element of  $H$  commutes with every element of  $K$ .