Name and Surname:
Student Number:

Math 466 - Fall 2019 - METU

Quiz 1

Let G be a finite group and let x and y be elements G. Show that x and gxg^{-1} have the same order. Now prove that xy and yx have the same order for any two elements x and y of G.

Let m be the order of x and let n be the order of gxg^{-1}. We have

$$(gxg^{-1})^m = gx^m g^{-1} = gg^{-1} = e$$

Thus $n \leq m$. Similarly

$$e = (gxg^{-1})^n = gx^n g^{-1}$$

It follows that $x^n = e$ and therefore $m \leq n$. We conclude that $n = m$.

Note that $yx = x^{-1}(xy)x$. Thus yx and xy have the same order by the previous part if we choose $g = x^{-1}$.