Tutorial 4

SC-220 Groups and Linear algebra Autumn 2019

(Lagrange's theorem)

(1) Carry out the procedure of the Lagrange's theorem for $G = D_6$ and $H =< r >$ and then $H =< r^3 >$

(2) Let H be a subgroup of G. Show that $g_1H = g_2H$ iff $g_1^{-1}g_2 \in H$

(3) Let G be a group and $|G| = pq$ where p and q are primes. Show that any proper subgroup of G is cyclic.

(4) The remainder when 3^{64} is divided by 20 is?

(5) If H and K are subgroups of a group G such that their orders are relatively prime, show that H and K only have the identity element in common.

(6) Let G be a finite Abelian group and let m be the LCM of the orders of its elements. Prove that G contains an element of order m.