MATH 473 WINTER 2019 HOMEWORK 19

1. Let a and b be the following permutations in S_7 :

$$a = (1 \ 2 \ 3 \ 4 \ 5 \ 6 \ 7), \quad b = (2 \ 3 \ 5)(4 \ 7 \ 6).$$

Check that $a^7 = b^3 = e$ and $b^{-1}ab = a^2$. Then show that the group G generated by a and b has order 21.

- 2. Determine the conjugacy classes of the group G from problem 1.
- 3. Determine the character table of the group G from problem 1.
- 4. Let G be a group, and let H be a subgroup of G (not necessarily normal). Suppose that χ is a character of G.
 - (a) Show that the restriction $\chi|_H$ is a character of H.
 - (b) Prove that if $\chi|_H$ is irreducible, then χ is irreducible.