

Université Galatasaray, Département de Mathématiques

Math 504 - Advanced Algebra

Quiz 3, 22/11/2021

Name & Surname:

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1. Let G be a group of order 12. In this exercise, we will show that if the Sylow 3 subgroup of G is not normal, then $G \cong A_4$.
 - i. Determine the number of possibilities of n_3 .
 - ii. Let φ denote the permutation representation associated with the action of G on the set of Sylow 3 subgroups. Show that $\ker(\varphi) = \{e\}$.
 - iii. Determine the number of order 3 elements in G .
 - iv. Complete the proof by counting the number of subgroups of order 12 of \mathfrak{S}_4 .