

Homework 8

MATH 301

Due Wednesday, April 19, 2023.

Instructions. Read the [Homework Guide](#) to make sure you understand how to successfully complete the assignment. All claims must be sufficiently justified.

Exercise 1. Recall that $|S_4| = 4! = 24$. Show that for any divisor d of 24 there exists a subgroup H of S_4 such that $|H| = d$. (In class, we showed that this failed for A_4 .)

Exercise 2. Let H be a subgroup of a group G . Fix $g \in G$ and define $\varphi_g: H \rightarrow gH$ by $\varphi_g(h) = gh$. Prove that φ_g is a bijection.

Exercise 3. Complete the following exercises from [Section 6.4](#) in the course textbook:

1, 3, 4, 5 (all except g.), 12, 17, 18