

Math-113, Homework 4, non-textbook problems

A. (*This problem is continuation of Problem A from HW3.*)

Let S_3 be a permutation group on three letters.

- List all elements in S_3 and compute their cycle decomposition.
- For each permutation in S_3 determine its sign.
- Prove that alternating group A_3 is isomorphic to \mathbb{Z}_3 , a cyclic group of order 3

B. Prove that A_4 is not a cyclic group.

Hint: You have listed all elements of A_4 in exercise 19, what can you say about their orders?