

Math 3140: Homework 4

A.

6.3. Show that the elements $w \in S_9$ such that $\{w(2), w(5), w(7)\} = \{2, 5, 7\}$ form a subgroup of S_9 . What is the order of this subgroup?

6.7+. (a) Describe/characterize the elements of order 2 of S_n .

(b) Show that if $n \geq 4$, then every permutation can be written as a product of two permutations of order 2. Hint: Answer the question first for cycles.

(c) What goes wrong in (b) if $n < 4$?

B. Recall the definitions of in and out shuffles from Homework 3. We may view them as elements of S_{52} .

(a) Explain how to determine whether a permutation $w \in S_n$ is even based on the lengths of the cycles in its cycle decomposition.

(b) Are the in and out shuffles in A_{52} ?

C. 6.6, 6.9