

Math 3140: Homework 4

Due: Wednesday, September 24

A.

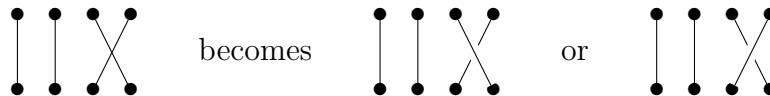
6.3. Show that the elements $w \in S_9$ such that $\{w(2), w(5), w(7)\} = \{2, 5, 7\}$ form a subgroup of S_9 . What is the order of this subgroup?

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

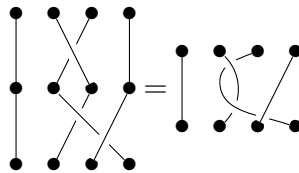
(b) Show that if $n \geq 4$, then every permutation can be written as a product of two permutations of order 2. Hint: Answer the question first for cyclic permutations.

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

B. The *braid group* B_n is a group generated by the diagrams of S_n but we keep track of where strings cross. For example,



and we keep track of these crossings when multiplying,



What is the inverse of an element in B_n ? Show that B_n has infinite order. What are the elements of finite order in B_n ?

C. 6.6, 6.9