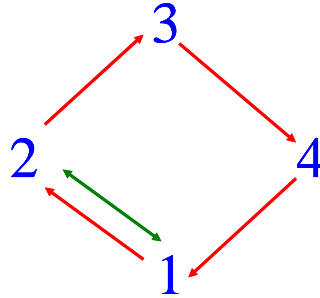


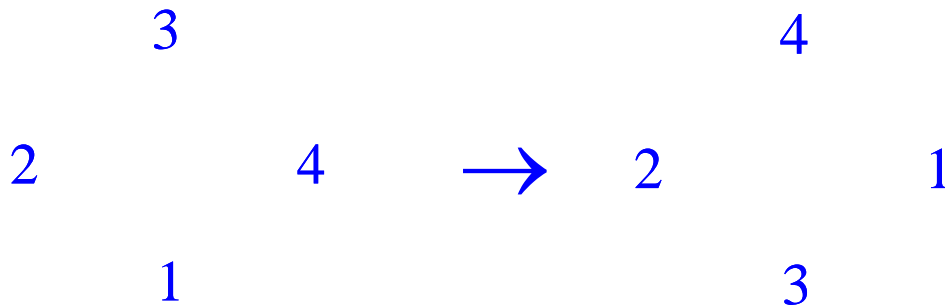
## Lesson 6

### GENERATOR DIAGRAMS – ANSWERS

1. Consider the diagram below.



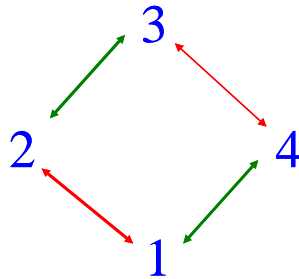
Using the moves  $r = (1,2,3,4)$  and  $f = (1,2)$ , find a combination that converts the original diagram into the configuration that follows it.



There are many possible answers, but

$frfr = (1,2)(1,2,3,4)(1,2)(1,2,3,4) = (2)(1,4,3) = (1,4,3)$  is one of them.

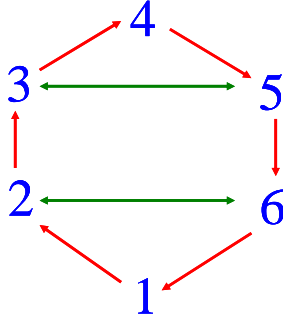
2. Find all the elements in the group generated by the moves indicated below,  $(1,2)(3,4)$  and  $(1,4)(2,3)$ . Is this group abelian?



## Lesson 6

The indicated group is  $G = \{ (), (1,2)(3,4), (1,3)(2,4), (1,4)(2,3) \}$ . Also, since it has order 4 and the smallest nonabelian group is  $S_3$  which has order 6, this group must be abelian.

3. Determine the order of the group created by the following generator diagram.



The diagram is suggestive of a regular hexagon that we are allowed to either rotate clockwise or flip about the vertical axis. Hence, the group generated is the dihedral group  $D_6$ , and, thus, its order is  $2 \cdot 6 = 12$ .