Instructions. Write all answers clearly on one piece of paper, and put all group members' names on the top of the paper. If you talk, you must do so **very quietly**!

- 1. Suppose the domain of a permutation is some set A. What is the range of the permutation? What is the image of the permutation?
- 2. (True/False) When a permutation is composed with a second permutation having the same domain, the result is a permutation.
- 3. For the permutation α given in two-line notation by

$$\alpha = \begin{bmatrix} 1 & 2 & 3 & 4 & 5 & 6 \\ 2 & 1 & 4 & 6 & 5 & 3 \end{bmatrix},$$

where does α map the vertex 3?

4. What is the cycle notation form of the permutation α in question 3? Hint: the cycle form looks like

$$(a_1 a_2 \cdots)(b_1 b_2 \cdots) \cdots$$

and every element of the domain appears exactly once. A cycle $(a_1 a_2 \cdots a_k)$ means $a_1 \rightarrow a_2 \rightarrow \cdots \rightarrow a_k \rightarrow a_1$.