
Homework 4, Due Monday, Sep 30

This homework must be done individually. Remember to follow Math department's guidelines for homework. Please write your solutions neatly. Typesetting in LaTeX is appreciated and encouraged.

1. Let S be a finite set and let $f : S \rightarrow S$ be a function. Show f is one-to-one if and only if f is onto. Also show that this result need not be true if S is not finite.
2. Problem 10 on page 84 of the textbook.
3. List the elements of the cyclic subgroup of S_6 generated by $\sigma = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 \\ 2 & 3 & 4 & 1 & 6 & 5 \end{pmatrix}$.
Is S_6 a cyclic group? Why or why not?
4. Find all cyclic subgroups of D_4 . Does D_4 have any proper subgroups that are not cyclic? Does S_3 have any proper subgroups that are not cyclic? What is the relationship between D_3 and S_3 ?