November 12, 2018 Lecturer Dmitri Zaitsev

Course 1213 - Introduction to group theory 2018

Sheet 8

Due: at the end of the tutorial

Exercise 1

(i) Find all injective homorphisms from $\mathbb{Z}$ and the group of all numbers 2^n, $n \in \mathbb{Z}$.

(ii) Find all surjective homorphisms from $\mathbb{Z}_6$ to $\mathbb{Z}_3$.

Exercise 2

(i) Determine all cosets in $\mathbb{Z}_{10}$ modulo the subgroup $\langle[5]\rangle$ generated by [5].

(ii) Determine left and right cosets in S_3 modulo the subgroup H generated by the cycle (23).

(iii) If $H \subset G$ is a subgroup, prove that $Hg = H$ if and only if $g \in H$.

Exercise 3

Prove or disprove:

(i) Composition of two group homomorphisms is a group homomorphism.

(ii) Homomorphic image of a cyclic group is cyclic.