

## HOMEWORK 6

1. Find an isomorphism between the group of integers under addition to the group of even integers under addition.
2. Show that  $\mathbb{Z}$  has infinitely many subgroups isomorphic to  $\mathbb{Z}$ .
3. Prove that  $S_4$  is not isometric to  $D_{12}$ .
4. Suppose that  $\phi : \mathbb{Z}_{20} \rightarrow \mathbb{Z}_{20}$  is an automorphism and  $\phi(5) = 5$ . What are the possibilities for  $\phi(x)$ ?
5. Find  $\text{Aut}(\mathbb{Z})$ .
6. If  $G$  is a group, prove that  $\text{Aut}(G)$  and  $\text{Inn}(G)$  are groups.