



NUMBER THEORY II  
FALL 2010

ASSIGNMENT 11.1  
DUE NOVEMBER 10

**Exercise 1.** Let  $G$  and  $H$  be groups and suppose that  $\phi : G \rightarrow H$  is a homomorphism. Prove that the function  $\Phi : \widehat{H} \rightarrow \widehat{G}$  given by  $\Phi(f) = f \circ \phi$  is a homomorphism. Use this to prove that if  $G \cong H$  then  $\widehat{G} \cong \widehat{H}$ .

**Exercise 2.** Construct tables that give all the character values for the groups  $\mathbb{Z}_8^\times$ ,  $\mathbb{Z}_9^\times$  and  $\mathbb{Z}_{10}^\times$ .