

Do the following exercises from Judson:

Chapter 9, Section 9.3: 5, 11, 12, 16 (d)

Chapter 10, Section 10.3: 4, 7

Exercises not from the text:

1. If G is any group, define $\alpha : G \rightarrow G$ by $\alpha(g) = g^{-1}$. Show that G is abelian if and only if α is a homomorphism.
2. If $\alpha : G \rightarrow G_1$ is a homomorphism, show that $K = \{g \in G : \alpha(g) = 1\}$ is a subgroup of G .
3. In each case determine whether $\alpha : G \rightarrow G_1$ is an isomorphism.
 - (a) $G = G_1 = \mathbb{Z}$, $\alpha(n) = 2n$.
 - (b) $G = G_1 = \mathbb{Z}_5^*$, $\alpha(g) = g^3$.
 - (c) $G = G_1 = \mathbb{Z}_8$, $\alpha(g) = 2g$.