

University of Bahrain
Department of Mathematics
MATHS311: Abstract Algebra 1
Fall 2017
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Homework 11: Isomorphisms due on December 28
Hand all the problems

Name: _____

1. Show that $U(10)$ and $U(5)$ are isomorphic.

2. Show that $U(7)$ is isomorphic to \mathbb{Z}_6 . Can you generalize the result to $U(p)$ and \mathbb{Z}_p , for any prime p ?

3. Let G be a group and let $g \in G$ be a fixed element. Consider the map

$$\begin{aligned}\varphi_g : G &\rightarrow G \\ a &\mapsto gag^{-1}\end{aligned}$$

Show that φ_g is an automorphism. It is called the **inner** automorphism.

4. Let G be a multiplicative group. Let G^{op} , define a new binary operation $*$ on G^{op} by $a * b = ba$.

(a) Show that $(G^{op}, *)$ is a group.

(b) Show that $G \simeq G^{op}$.