

PMATH 347 Groups and Rings, Exercises for Chapter 6

1: For each of the following groups G , find a group of the form $\mathbb{Z}_{n_1} \times \mathbb{Z}_{n_2} \times \cdots \times \mathbb{Z}_{n_i}$ with $n_i | n_{i+1}$ for all i , which is isomorphic to G .

(a) $G = \mathbb{Z}_2 \times \mathbb{Z}_4 \times \mathbb{Z}_5 \times \mathbb{Z}_6 \times \mathbb{Z}_8 \times \mathbb{Z}_9 \times \mathbb{Z}_{12} \times \mathbb{Z}_{18} \times \mathbb{Z}_{25}$.

(b) $G = U_{180}$

(c) $G = U_{60} / \langle 29 \rangle$.

2: (a) List all of the abelian groups of order 1,500.

(b) Determine the number of abelian groups of order 160,000.