Homework 11 - Classification of Abelian Groups

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1. List all abelian groups with the following orders.

(a) Order $= 27$

(b) Order $= 500$

(c) Order $= 900$

2. How many elements of order 2 are in the following groups of order 16?

(a) $\mathbb{Z}_{16}$

(b) $\mathbb{Z}_4 \times \mathbb{Z}_4$

(c) $\mathbb{Z}_4 \times \mathbb{Z}_2 \times \mathbb{Z}_2$

3. How many elements of order 4 are in the following groups of order 16?

(a) $\mathbb{Z}_{16}$

(b) $\mathbb{Z}_4 \times \mathbb{Z}_4$

(c) $\mathbb{Z}_4 \times \mathbb{Z}_2 \times \mathbb{Z}_2$

4. Answer the following question by computing the order (using the 1^{st} isomorphism theorem) and then checking orders of elements.

Identify $(\mathbb{Z}_{16} \times \mathbb{Z}_{16}) / \langle (2,2) \rangle$ as a product of cyclic groups (without a quotient).