

Homework #7

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Name _____

In exercises 1-15, The group \mathbb{Z}_n is the group (\mathbb{Z}_n, \oplus) , where \oplus is addition modulo n .

1. List the elements of the group $\mathbb{Z}_3 \times \mathbb{Z}_2 \times \mathbb{Z}_2$
2. Determine whether or not $\mathbb{Z}_3 \times \mathbb{Z}_2 \times \mathbb{Z}_2$ is cyclic. If it is cyclic, list the generators.
3. Compute the sum of the elements $(2, 1, 0)$ and $(1, 1, 1)$ in the group $\mathbb{Z}_3 \times \mathbb{Z}_2 \times \mathbb{Z}_2$
4. Compute the sum of the elements $(2, 1, 0)$ and $(2, 1, 1)$ in the group $\mathbb{Z}_3 \times \mathbb{Z}_2 \times \mathbb{Z}_2$
5. List the elements of the group $\mathbb{Z}_6 \times \mathbb{Z}_2$
6. Determine whether or not $\mathbb{Z}_6 \times \mathbb{Z}_2$ is cyclic. If it is cyclic, list the generators.
7. Compute the sum of the elements $(5, 1)$ and $(4, 0)$ in the group $\mathbb{Z}_6 \times \mathbb{Z}_2$
8. Compute the sum of the elements $(3, 1)$ and $(4, 1)$ in the group $\mathbb{Z}_6 \times \mathbb{Z}_2$
9. List the elements of the group $\mathbb{Z}_4 \times \mathbb{Z}_3$
10. Determine whether or not $\mathbb{Z}_4 \times \mathbb{Z}_3$ is cyclic. If it is cyclic, list the generators.
11. Calculate the order of the element $(4, 9)$ in the group $\mathbb{Z}_{18} \times \mathbb{Z}_{18}$
12. Calculate the order of the element $(7, 5)$ in the group $\mathbb{Z}_{12} \times \mathbb{Z}_8$
13. Calculate the order of the element $(8, 6, 4)$ in the group $\mathbb{Z}_{18} \times \mathbb{Z}_9 \times \mathbb{Z}_8$
14. Calculate the order of the element $(8, 6, 4)$ in the group $\mathbb{Z}_9 \times \mathbb{Z}_{17} \times \mathbb{Z}_{10}$
15. Suppose that $(A, *) \leq (G, *)$ and that $(B, *) \leq (H, *)$. Show that $(A \times B, *) \leq (G \times H, *)$.