9. Give an example of a non-cyclic group of order 16. I do not need to see many details.

*abelien*

$U_2 \times D_4$ has order 16 and is not abelien

10. Find all of the subgroups of $(\mathbb{Z}_{12}, +)$. Be sure to tell me why you know that you have all of the subgroups.

$\mathbb{Z}_{12}$ is cyclic. Thus every subgroup is cyclic. The subgroups are

$\langle [0]_{12} \rangle = \{[0]_{12}\}$

$\langle [1]_{12} \rangle = \langle [5]_{12} \rangle = \langle [7]_{12} \rangle = \langle [11]_{12} \rangle = \mathbb{Z}_{12}$

$\langle [2]_{12} \rangle = \langle [10]_{12} \rangle = \{[2]_{12}, [4]_{12}, [6]_{12}, [8]_{12}, [10]_{12}, [0]_{12}\}$

$\langle [3]_{12} \rangle = \langle [9]_{12} \rangle = \{[3]_{12}, [6]_{12}, [9]_{12}, [0]_{12}\}$

$\langle [4]_{12} \rangle = \langle [8]_{12} \rangle = \{[4]_{12}, [8]_{12}, [0]_{12}\}$

$\langle [6]_{12} \rangle = \{[6]_{12}, [0]_{12}\}$