1. $\langle \mathbf{4+4+4} \rangle$ Consider the abelian additive group of integers $\mathbb{Z}$. (a) For any integer n, show that the set $n\mathbb{Z}$ of integers divisible by n is a subgroup. (b) Find the cosets of $n\mathbb{Z}$ in $\mathbb{Z}$. (c) Argue that the quotient $\mathbb{Z}/n\mathbb{Z}$ is isomorphic to the **cyclic group** C_n.

2. $\langle \mathbf{6} \rangle$ Identify the **quotient groups** $U(1)/C_n$ where C_n is the cyclic group of order $n \geq 1$.