

**Mathematical Methods, Spring 2024 CMI**

Assignment 12

Due by the beginning of the class (1030 am) on Thu, Apr 18, 2024

**quotient groups**

1. **⟨4+4+4⟩** 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. **⟨6⟩** Identify the **quotient groups**  $U(1)/C_n$  where  $C_n$  is the cyclic group of order  $n \geq 1$ .