

HT 2022

ASO: Group Theory

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1 Group Theory Basics

1.1 Basic Groups

Cyclic Groups

Definition 1.1 (Cyclic group)

The cyclic group C_n is the group generated by a non-trivial generator g of order n .

There are two common realizations of a cyclic group. The first is the additive group of integers modulo n (i.e. $C_n \cong \mathbb{Z}_n$). The second is the multiplicative group with powers of a primitive n^{th} root of unity $\zeta \in \mathbb{C}$.

Symmetric Groups

Definition 1.2 (Symmetric group)

The symmetric group S_n is the group of all permutations (bijections) of the set $\{1, \dots, n\}$ with composition as the group operation.