LARP Tutorial

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1   Tutorial 1: 01-08-25

1. Consider $n \in \mathbb{N}$, $n \geq 2$.

   Show that $(\mathbb{Z}_n, +_n, \cdot_n)$ is a field iff n is a prime number.

2. Consider a group $(G, \cdot)$, i.e., $G \times G \to G$.

   Show that for $x \in G$, the inverse of x is unique.

3. Consider a finite set X. Then $S(X)$, the set of all invertible elements, is $(X^\times, \circ)$.

4. Prove that $\equiv_n$ is an equivalence relation.

5. Show that $(\mathbb{Z}, +, \cdot)$ is a commutative ring.