CS 235: Algebraic Algorithms, Spring 2021

Discussion 7

Tuesday, April 6th, 2021.

Problem 1. Let N be a normal subgroup of prime index p in a group G. What can we say about the quotient group G/N?

Problem 2. Show that for two integers n, m where $\gcd(n, m) = 1$, we have $\mathbb{Z}_n \times \mathbb{Z}_m \cong \mathbb{Z}_{nm}$.

Problem 3. Show that (abelian) group isomorphism is an equivalence relation. Namely, let G_1, G_2, G_3 be abelian groups, we have:

(a) $G_1 \cong G_1$

(b) $G_1 \cong G_2 \implies G_2 \cong G_1$

(c) $G_1 \cong G_2$ and $G_2 \cong G_3 \implies G_1 \cong G_3$.