# CS 235: Algebraic Algorithms, Spring 2021

## Discussion 6

Tuesday, March $30^{th}$, 2021.

**Problem 1.** Cosets and Quotient Groups:

(a) Find all cosets of subgroup $\langle 4 \rangle$ of $\mathbb{Z}_{12}$.

(b) Find the index of the quotient group $\mathbb{Z}_{24}/\langle 3 \rangle$. What are its elements?

**Problem 2.** Group Isomorphism: explain why the following pairs of groups are (or are not) isomorphic.

(a) $\mathbb{Z}_4$ and $\mathbb{Z}$

(b) $\mathbb{Z}_2 \times \mathbb{Z}_2$ and $\mathbb{Z}_4$

(c) $\mathbb{Z}_8^*$ and $\mathbb{Z}_{12}^*$

**Problem 3.** Exponent of a Group: find the exponent of the following groups.

(a) $\mathbb{Z}_{35}$ and $\mathbb{Z}_{15} \times \mathbb{Z}_{35}$

(b) $\mathbb{Z}_{15}^*$ and $\mathbb{Z}_{600}^*$.