Math 2326 - Introduction to Abstract Mathematics
Assignment 23 - Due Friday, March 14

Problem 80: List all the subgroups of $\mathbb{Z}_{42}$.

Problem 81: For $n \in \mathbb{N}$, let $\mathcal{S}_n$ denote the set of bijections from $\mathcal{I}_n$ to itself. (Recall that $\mathcal{I}_n = \{1, 2, \ldots, n\}$.)

a. Show that $\mathcal{S}_n$ is a group under function composition.

b. State the order of $\mathcal{S}_n$.

c. Show that $\mathcal{S}_4$ is non-Abelian.

d. Does $\mathcal{S}_4$ contain any Abelian subgroup other than $\{e\}$?

Problem 82: Let $G = \langle a \rangle$ be a group of order 30 and let $f : Z_{30} \to G$ by $f(i) = a^i$. Show that f is injective. Is f surjective as well?