MTH101: Symmetry
Tutorial 04

Problem 1. Write out the multiplication table for the group $U(12)$.

Problem 2. What is the remainder when you divide 2^{343} by 37.

Problem 3. Prove that if n is an odd number, then $n^2 \equiv 1(\mod 8)$.

Problem 4. Let G be a group. Let

$$Z = \{z | z \in G \text{ and } zg = gz \text{ for all } g \in G\}.$$

Prove that Z is a subgroup of G.

Problem 5. List all generators of the groups $\mathbb{Z}/9\mathbb{Z}$, $\mathbb{Z}/12\mathbb{Z}$ and $\mathbb{Z}/20\mathbb{Z}$. What do you think will be the generators of $\mathbb{Z}/n\mathbb{Z}$ in general?

Problem 6. Is the group $U(8)$ cyclic?