No. 26

1. (3 points) Group homomorphisms.

2. (3 points) Determine the subgroups and the factor groups of the group $(\mathbb{Z}_{10}, +)$.

3. (3 points) Show that

$$\mathcal{M} = \left\{ \begin{pmatrix} a & b \\ b & a \end{pmatrix} \middle| a, b \in \mathbb{Q} \right\}$$

is a subring of the ring $(M_2(\mathbb{Q}), +, \cdot)$.

Plus 1 point for free and bonus points.