MAT 150A, Fall 2019 Homework Assignment 5

Due before the start of the class on Wednesday, November 6

1. Solve the system of equations $x = 3 \mod 5$, $x = 10 \mod 11$.

2. Is it possible to construct an injective homomorphism (a) from \mathbb{Z}_3 to \mathbb{Z}_4 ? (b) From S_3 to S_4 ?

3. Are the following matrices orthogonal? Do they preserve the orientation? Please explain your answers.

$$(a) \quad \begin{pmatrix} 1 & 2\\ 3 & 4 \end{pmatrix} \quad (b) \quad \begin{pmatrix} \frac{1}{2} & -\frac{\sqrt{3}}{2}\\ \frac{\sqrt{3}}{2} & \frac{1}{2} \end{pmatrix}$$

4. Suppose that M is an $n \times n$ matrix of finite order. Find all possible values for $\det(M)$.

The homework must be legible, and written in connected sentences that explains what you are doing. Just the answer (whether correct or not) is not enough. Please put your name and section number on every page and staple the pages together. Homework should be handed in on time, late homework will not be graded.