Homework 2 for Math 3121

Due Time: Oct 2, 11pm .

Problem 1. Compute the order of elements (just give the answers, no details needed):
(1). $-1, -i, \frac{1}{2} + \frac{\sqrt{3}}{2}i, 3$ in $G = \mathbb{C}^*$,
(2). $5, 6, 8$ in $\mathbb{Z}_{12}$.
(3). $\begin{pmatrix} 0 & -1 \\ 1 & 0 \end{pmatrix}, \begin{pmatrix} 1 & -1 \\ 1 & 0 \end{pmatrix}$ in $GL(2, \mathbb{R})$.

Problem 2. Page 55, problems 1,3,4,5,6,7,8,9 (just answer "yes" or "no", no reasons needed.)

Problem 3. Let G be a group, suppose that $a^2 = e$ for all $a \in G$, prove that G is an abelian group.

Problem 4. Let G be a **finite** group and S be a non-empty subset of G. Suppose that S is closed under the binary operation of G, prove that S is a subgroup of G.