1. *Show that* $A=\{\left⌈\begin{matrix}a&b\\2b&a\end{matrix}\right⌉:a,b\in Q and \left(a,b\right)\ne \left(0,0\right)\}$*forms a group under matrix multiplication.*
2. Let (G,o) be a group and a$\in G$.If O(a)=n then for m$\in Z^{+}$ O($a^{m}=\frac{n}{gcd⁡(m,n)}$.
3. *Show that*$ G=\{cos \frac{2kπ}{n}+isin\frac{2kπ}{n} :k=0,1,……,n-1\}$ *is cyclic group under multiplication. Find its generators.*
4. Prove that SL(n,R) is normal subgroup of GL(n,R).
5. Let (G,o) be a group in which $(aob)^{3}=a^{3}ob^{3}$ $for all a,b\in G$ .Show that H=$\{x^{3}: x\in G\}$ is a normal subgroup of G.
6. If O(G)=$ p^{2}$ ,where p is prime then show that G is abelian.
7. State and proof Lagrange’s theorem.
8. Prove that every non zero element in a finite ring having no divisor of zero is a unit.
9. Let R be a ring with unity I and $a\in R$ if there exist a unique b in R such that ab=I. Prove that ba=I too and a is a unite.