## M E T U

## Department of Mathematics



1. (10 pts.) Find $d=\operatorname{gcd}(431,29)$ and find integers $a, b$ such that $d=431 a+29 b$.
2.(10 pts.) Suppose that $a, b, c$ are non-zero integers such that $b \mid a$ and $c \mid a$. Let $d=g c d(b, c)$. Prove that $b c \mid a d$.
2. (10 pts.) Solve the congruence $41 x \equiv 5(\bmod 43)$.
3. (10 pts.) Find the subgroup generated by [6] in the group $\mathbb{Z}_{14}$.
4. (10 pts.) Let $G$ be a group and $H \subset G$ is a subgroup. Let $C=\{g \in G: g h=h g$ for all $h \in H\}$. Show that $C$ is also subgroup of $G$.
5. (10 pts.) Let $G$ be a group such that for all $a$ in $G$ we have $a^{-1}=a$. Show that $G$ is abelian.
