

Modular Arithmetic

Exercise 1. Let $a, b, n \in \mathbb{Z}$, $n \geq 2$. Show that if $a \bmod n = b \bmod n$ and $(a, n) = 1$ then $(b, n) = 1$. Use this to conclude that $U(n)$ is closed under multiplication modulo n .

Exercise 2. Let G be a group, $g \in G$, $n \in \mathbb{Z}^+$ and $a, b \in \mathbb{Z}$. Show that if $g^n = e$ and $a \bmod n = b \bmod n$ then $g^a = g^b$.