

Project 6.27: Finish your work on this project. Specifically, state and prove a proposition that characterizes the set of $n \geq 2$ such that \mathbb{Z}_n satisfies the cancellation property (Axiom 1.5). You can opt to prove either Axiom 1.5 or its equivalent version Proposition 1.26.

Lemma 6.B: Suppose $a, b \in \mathbb{Z}$, $g \in \mathbb{Z}_{\geq 0}$, and

- (1) $g \mid a$ and $g \mid b$
- (2) For all $d \in \mathbb{Z}$ such that $d \mid a$ and $d \mid b$, $d \mid g$.

Then $g = \gcd(a, b)$.

Proof. Your proof goes here.

□

Lemma 6.C: Suppose p is prime and $a \in \mathbb{Z}$. Then either $p \mid a$ or $\gcd(p, a) = 1$.

Proof. Your proof goes here.

□

Proposition 6.30: For all $k, m, n \in \mathbb{Z}$,

$$\gcd(km, kn) = |k| \gcd(m, n)$$