MATH 120A Prep: Modular Arithmetic

1. Write the elements for $\mathbb{Z}_5$ then create an addition and multiplication table for $\mathbb{Z}_5$.

2. Let $[a]_n$ denote the equivalence class of a in the set $\mathbb{Z}_n$. Define a function $f : \mathbb{Z}_9 \to \mathbb{Z}_3$ by $f([a]_9) = [a]_3$. Show this map is well-defined and write out where each element of $\mathbb{Z}_9$ maps to in $\mathbb{Z}_3$. What are the elements of $\mathbb{Z}_9$ that map to $[0]_3$?

3. Using the same function from Problem 2, prove that $f([a]_9 + [b]_9) = f([a]_9) + f([b]_9)$.