

Math 113 Theorems.

1. **Prop.** The relation $\equiv \pmod{n}$ is an equivalence relation.
2. **Prop.** $\mathbb{Z}/n\mathbb{Z}$ has exactly n elements.
 - (a) **Prop 0.** If $i \in [j]$, then $j \in [i]$ (in $\mathbb{Z}/n\mathbb{Z}$).
 - (b) **Prop 1.** If $[i] \cap [j] \neq \emptyset$, then $[i] = [j]$.
 - (c) **Prop 2.** If $i \neq j$ and $0 \leq i, j \leq n-1$, then $[i] \cup [j] = \emptyset$.
 - (d) **Prop 3.** Every $x \in \mathbb{Z}$ belongs to one of $[0], \dots, [n-1]$.
3. **Prop.** Addition is correctly (well-defined) defined on $\mathbb{Z}/n\mathbb{Z}$ by $[a] + [b] = [a + b]$.