

Definition

Choose and fix $n \in \mathbb{N}$. Define \sim_n on \mathbb{Z} by

$$x \sim_n y \iff x \equiv y \pmod{n}.$$

Proved many times....

\sim_n is an equivalence relation.

Equivalence classes

$$\begin{aligned} [r] &= \{x \in \mathbb{N} : x \equiv r \pmod{n}\} \\ &= \{x \in \mathbb{N} : n \mid (x - r)\} \end{aligned}$$