0.1 Congruence relation (an equivalence relation)

two integers a and b are congruent modulo n: $a \equiv b \pmod{n}$, with $(a-b)/n = z$, where $z \in Z$. n is the "modulus" of the congruence (imagine a clock, 12 is the modulus).

0.2 Congruence classes (the equivalence class)

The equivalent class of the integer a is $\overline{a}_n := \{\dots, a-2n, a-n, a, a+n, a+2n, \dots\}$.

0.3 Integers modulo n

Def: The set of all congruence classes of the integers for a modulus n

$$Z/nZ = \{\overline{a}_n | a \in Z\}. \tag{1}$$

When $n \neq 0$

$$Z/nZ = \{\overline{0}_n, \overline{1}_n, \dots, \overline{n-1}_n\}. \tag{2}$$

When $n = 0$, Z/nZ is isomorphic to Z.