congruence modulo

Example.

$$31 \equiv 46 \mod 3$$

$31 \equiv 46 \mod 5$

Definition Congruence

We say that a is congruent to b modulo m if and only if m divides $a - b$

Exercise 4.

congruence modulo

Definition Congruence

We say that a is congruent to b modulo m if and only if m divides $a - b$

- Whether two integers a and b have the same remainder when divided by n
- Notation: $a \equiv b \mod m \leftrightarrow a$ is congruent to b modulo m
  $a \not\equiv b \mod m \leftrightarrow a$ is not congruent to b modulo m
- A congruence modulo asks whether or not a and b are in the same equivalence class

Example.

The numbers 31 and 46 are congruent $\mod 3$ because they differ by a multiple of 3.
We can write this as $31 \equiv 46 \mod 3$
Since the difference between 31 and 46 is 15, then these numbers also differ by a multiple of 5; i.e.,
$31 \equiv 46 \mod 5$

Exercise 4.

Find the equivalence classes of $\mod 3$

rules of modular arithmetic