

commence modo

Example.

$$31 \equiv 46 \pmod{3}$$

$$31 \equiv 46 \pmod{5}$$

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:
 $a \equiv b \pmod{m} \leftrightarrow a$ is congruent to b modulo m
 $a \not\equiv b \pmod{m} \leftrightarrow a$ 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 $\pmod{3}$ because they differ by a multiple of 3.

We can write this as $31 \equiv 46 \pmod{3}$

Since the difference between 31 and 46 is 15, then these numbers also differ by a multiple of 5; i.e.,

$$31 \equiv 46 \pmod{5}$$

Exercise 4.

Find the equivalence classes of $\pmod{3}$

rules of modular arithmetic

rules of modular arithmetic