

mathematic

Addition (and subtraction)

If $a \equiv b \pmod{m}$ and
 $c \equiv d \pmod{m}$ then

$$a + c \equiv b + d \pmod{m}$$

Multiplication

If $a \equiv b \pmod{m}$ and
 $c \equiv d \pmod{m}$ then
 $a \times c \equiv b \times d \pmod{m}$

Division

The remainder after division is always congruent to the number we are dividing.

Example.

Example.

Example.

rules of modular arithmetic

Addition (and subtraction)

If $a \equiv b \pmod{m}$ and
 $c \equiv d \pmod{m}$ then
 $a + c \equiv b + d \pmod{m}$

Example.

$$\begin{aligned} 87 &\equiv 2 \pmod{17} \quad \text{and} \\ 222 &\equiv 1 \pmod{17} \\ \implies 87 + 222 \pmod{17} &\equiv 2 + 1 \pmod{17} \equiv 3 \pmod{17} \end{aligned}$$

Multiplication

If $a \equiv b \pmod{m}$ and
 $c \equiv d \pmod{m}$ then
 $a \times c \equiv b \times d \pmod{m}$

Example.

$$\begin{aligned} 9876 &\equiv 6 \pmod{10} \quad \text{and} \\ 17642 &\equiv 2 \pmod{10} \\ \implies 9876 \times 17642 \pmod{10} &\equiv 6 \times 2 \pmod{10} \equiv 2 \pmod{10} \end{aligned}$$

Division

The remainder after division is always congruent to the number we are dividing.

Example.

$$\begin{aligned} &\text{What is the remainder of } 17 \times 18 \text{ when it is divided by } 19? \\ &\text{We know that } 17 \equiv -2 \pmod{19} \text{ and } 18 \equiv -1 \pmod{19} \\ \implies 17 \times 18 &\equiv (-2) \times (-1) = 2 \pmod{19} \end{aligned}$$

Boolean algebra

Boolean algebra