$$\boxed{\text{Group 1}}$$

Theorem 1. Let $n \in \mathbb{N}$ and $a_1, a_2, b_1, b_2 \in \mathbb{Z}$. Let

$$a_1 \equiv a_2 \ (\text{mod } n)$$

and

$$b_1 \equiv b_2 \ (\text{mod } n).$$

Then $a_1 + b_1 \equiv a_2 + b_2 \ (\text{mod } n)$.

$$\boxed{\text{Group 2}}$$

Theorem 2. Let $n \in \mathbb{N}$ and $a_1, a_2, b_1, b_2 \in \mathbb{Z}$. Let

$$a_1 \equiv a_2 \ (\text{mod } n)$$

and

$$b_1 \equiv b_2 \ (\text{mod } n).$$

Then $a_1 \cdot b_1 \equiv a_2 \cdot b_2 \ (\text{mod } n)$.

$$\boxed{\text{Group 3}}$$

Theorem 3. Let $n \in \mathbb{N}$ and $a, b, c \in \mathbb{Z}$. If $a \equiv b \ (\text{mod } n)$ and $b \equiv c \ (\text{mod } n)$, then $a \equiv c \ (\text{mod } n)$.

(transitive)