

SIMPLE EQUATIONS IN MODULAR ARITHMETIC

Examples

Solve the following equations:

1. $8 \oplus x = 0 \pmod{9}$

2. $2x = 3 \pmod{7}$

3. $5x \oplus 2 = 3 \pmod{11}$

4. $4x \oplus 8 = 2 \pmod{9}$

Solutions

1. $8 \oplus x = 0 \pmod{9}$

$$\therefore 8 + x = 0$$

$$x = -8 \pmod{9}$$

$$= -8 + (9 \times 1)$$

$$= -8 + 9$$

$$\therefore x = 1 \pmod{9}$$

2. $2x = 3 \pmod{7}$

$$2x = 3 + (7 \times 1) = 3 + 7$$

$$\therefore 2x = 10$$

$$x = \frac{10}{2}$$

$$x = 5 \pmod{7}$$

3. $5x \oplus 2 = 3 \pmod{11}$