

# Problem Set 5

October 7, 2024

**Problem 1.** Let  $p$  be a prime number, and let  $ax - b \equiv 0 \pmod{p}$  be a linear congruent equation with  $a \not\equiv 0 \pmod{p}$ . Prove that the linear congruent equation has exactly one solution.

Hint: the existence of the solution is easy. To show the uniqueness of the solution, you need to show: suppose that  $ax_1 - b \equiv 0 \pmod{p}$  and  $ax_2 - b \equiv 0 \pmod{p}$ , then  $x_1 \equiv x_2 \pmod{p}$ .

**Problem 2.** Solve the congruent equation

$$x^{39} \equiv 3 \pmod{13}.$$