

HW4

This is due Monday, March 10

In the following p is a prime, \mathbb{Z}_p is a field of residues modulo p , $\mathbb{Z}_p[x]$ is a set of polynomials with coefficients in \mathbb{Z}_p .

1. Determine the number of solutions of the congruence $2x^3 + 5x^2 - 6x + 2 \equiv 0 \pmod{7}$.
2. Find all roots of the equation $1 + x + \dots + x^{p-2} \equiv 0 \pmod{p}$.
3. Find a non constant polynomial with coefficients in \mathbb{Z}_p that has no solutions in \mathbb{Z}_p .
4. Expand $x(x-1)\dots(x-(p-1)) \in \mathbb{Z}_p[x]$.