

Math 540B - Homework #2

1.

- (a) Find an irreducible polynomial of degree 2 over \mathbb{Z}_3 . Prove that it is irreducible.
- (b) Construct a field \mathbb{F}_9 of size 9.
- (c) What is the prime subfield of \mathbb{F}_9 ?
- (d) If \mathbb{F} is a finite field, then it can be shown that $\mathbb{F}^\times = \mathbb{F} \setminus \{0\}$ is a cyclic group under multiplication. Prove this for your finite field \mathbb{F}_9 in part (b).