

1. Let F_q be a finite field. Evaluate the sum and product of the non-zero elements of F_q .
2. Construct a finite field F_8 with 8 elements. You have to write down the addition and multiplication tables for this field.
3. Determine all the primitive elements of F_7 and F_{17} .
4. Determine all the prime polynomials of degree 5 in $F_2[x]$.
5. Prove that every element of F_q is the k th power of some element in F_q if and only if $\gcd(q-1, k) = 1$.