Finite Mathematics Problem Set 3

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1 EXERCISE 1

Compute the following cyclotomic polynomials

- $\Phi_1(x)$.

- $\Phi_{17}(x)$

- $\Phi_{1024}(x)$.

2 EXERCISE 2

Show that for all $x > 1$, $(x-1)^{\phi(k)} \leq \Phi_k(x) \leq (x+1)^{\phi(k)}$ is

3 EXERCISE 3

We have shown that $GL(2,p)$ has order $(p^2-1)(p^2-p) = p(p-1)(p+1)$. Can you find elements of order $p-1, p, p+1$ in $GL(2,p)$?

4 EXERCISE 4

Draw a picture of the projective plane over a field with 2 elements (meaning, draw its points and lines).