Tutorial 9 – Algebra 2019

(1) Revisit your construction of $\mathbb{F}_{16}$ and work through it, reframing it as constructing the splitting field of the polynomial $x^{16} - x$ over $\mathbb{F}_2$ step by step.
(2) In the last Tutorial, there was a missing condition: if K is a field and $f : K \to K$ is an automorphism of K *fixing the coefficients* of a given polynomial $p(x) \in K[x]$, then f permutes the roots of p.
(3) Let now K be a field of characteristic p, and let $f : K \to K$ be an automorphism. Recall how $\mathbb{F}_p$ sits inside K as a subfield and prove that f fixes each element of this subfield.