Algebra with finite field..

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Hello sir~

If F is a field of prime characteristic p,
then (a + b)^(p^n) = a + b for all a, b in F
and all positive integers n.

pf)
Let a, b in F.
Applying the binomial theorem to (a + b)^p,
we have
(a + b)^p = a^p + (p).a^(p−1).b + {p(p−1)/2}.a^(p−2).b^2
+ ... + p.a.b^(p−1) + b^p
= a^p + 0.a^(p−1).b + 0.a^(p−2).b^2 + ... + 0.a.b^(p−1) + b^p
= a^p + b^p
= a + b (***)

Proceeding by induction on n,
suppose that we have (a + b)^(p^(n−1)) = a + b.
Then (a + b)^(p^n) = [(a + b)^(p^(n−1))]^p = (a + b)^p = a + b.

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I can't understand (***)part.
Namely, a^p = a, b^p = b.
Why ?

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