

Re: every finite field is perfect

Source: <http://sci.tech--archive.net/Archive/sci.math/2005-04/msg02225.html>

- *From:* "Proginoskes" <proginoskes@xxxxxxxxxxxxx>
 - *Date:* 17 Apr 2005 23:33:31 -0700
-

warren065@xxxxxxx wrote:

- > A field F of prime characteristic p is said to be perfect
- > if the mapping $a \rightarrow a^p$ is a surjection on F .
- >
- > 1) Show that every finite field is perfect
- >
- > 2) Let F be an arbitrary field of characteristic p not
- > equal to 0. Show that the field $F(x)$ is not perfect.
- >
- > Proof: 1) [...]
- > Can I assume the surjection or do I need to prove that?
- > What would be a proper proof?

You need to show that the map $f(a) = a^p$ is a surjection. So, given some b in F , find an a such that $f(a) = b$.

> Proof: 2) No clue whatsoever how to approach this.

Suppose the map $f(a)$ is a surjection. Since F has characteristic p , then $p * 1 = 0$. Derive a contradiction.

--- Christopher Heckman

• *Follow-Ups:*

- ◆ ***Re: every finite field is perfect***
- ◇ *From:* warren065

• *References:*

- ◆ ***every finite field is perfect***
- ◇ *From:* warren065

- Prev by Date: ***Re: Summation over non-integers***
- Next by Date: ***Re: how to deal with the algebra problem?***
- Previous by thread: ***every finite field is perfect***

Re: every finite field is perfect

- Next by thread: ***Re: every finite field is perfect***
- Index(es):
 - ◆ ***Date***
 - ◆ ***Thread***