

A Book of Abstract Algebra | (2nd Edition)



Chapter 31, Problem 2EG



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Problem

If $\mathbb{Z}_p[y]$ is the domain of polynomials (in the letter y) over \mathbb{Z}_p , let $E = \mathbb{Z}_p(y)$ be the field of quotients of $\mathbb{Z}_p[y]$. Let K denote the subfield $\mathbb{Z}_p(y^p)$ of $\mathbb{Z}_p(y)$.

Prove that $a(x) = x^p - y^p$ has the factorization $x^p - y^p = (x - y)^p$ in $E[x]$, but is irreducible in $K[x]$. Conclude that there is an irreducible polynomial $a(x)$ in $K[x]$ with a root whose multiplicity is p .

Step-by-step solution

There is no solution to this problem yet.

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