Advanced Algebra II

Homework 12

due on Jun. 15, 2007

(1) Solve $x^2 \equiv 5(\mod 7^n)$ for all $n \geq 1$.
(2) If two absolute value are equivalent, then the induced topology are the same.
(3) Let K be a field with an absolute value $|\cdot|$. For a polynomial $f \in K[x]$, we define $|f|$ to be the maximum of all its coefficients. Verify that this defines an extension of absolute value.
(4) Show that $\mathbb{Q}_p$ contains all $p-1$-th root of unity.