

1. Let A be a finite dimensional F -algebra, $a \in A$ a unit of finite order m in the group of units of A , k a positive integer, and $p(x)$ the minimal polynomial of a . Prove
 - (1) m divides k iff $p(x)$ divides $x^k - 1$.
 - (2) $m = \min\{k : 0 < k \in \mathbf{Z} \text{ and } p(x) \text{ divides } x^k - 1\}$.
 - (3) If $m > 1$ and k is prime then $m = k$ iff $p(x)$ divides $x^k - 1$.