Let \( \rho : G \hookrightarrow GL(n, F) \) be a faithful representation of a finite group \( G \) over a field \( F \). It induces an action of the group on the vector space \( V = F^n \), thus on the dual space, and hence on the symmetric algebra on the dual, denoted by \( F[V] \). The subring of invariant polynomials is denoted by \( F[V]^G \). If \( n = 2 \) and \( F \) a finite field of characteristic \( p \) and order \( q = p^s \), then a \( p \)-Sylow subgroup \( G \) of \( GL(2, F) \) consists of all upper triangular matrices with 1’s on the diagonal. This is then an elementary abelian \( p \)-group of rank \( s \). Its invariants form a polynomial ring. We are interested in the \( n \)-fold vector invariants of this representation. As \( n \) increases these rings become more and more complicated, e.g., if \( n \geq 3 \) then the invariants are no longer Cohen-Macaulay. Nevertheless, we are able to present a complete generating set of these invariants. Furthermore, we expect that we can generalize our results to vector invariants of arbitrary \( p \)-groups. This work is done under the supervision of Prof. Dr. Mara D. Neusel and supported by the Barry M. Goldwater Foundation. (Received June 03, 2008)