

Math 120c - Spring 2003-2004
Lloyd Kilford

Homework set 1
Due: 9th April 2004

1. Give a proof that the ideal L_k of the ring of matrices $M_n(D)$ defined in lectures (or in Lang, page 657) is simple.
2. Let R be a finite dimensional commutative algebra over a field k . Assume that R has no nonzero nilpotent elements, and show that R is semisimple.
3. Exercise IX.1.1 of Hungerford (the question about the ring R of polynomials with weird multiplication).
4. Exercise IX.1.3 of Hungerford (infinite dimensional vector spaces).
5. Show that the \mathbf{Z} -module \mathbf{Q} does not have a simple submodule.