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 $\mathbb{Z}$-module $\mathbb{Q}$ does not have a simple submodule.