ALGEBRA 2. EXAM 2 SAMPLE

Problem 1. Let R be an integral domain and M be a *flat* module over R. Prove that M is torsion–free.

Problem 2. Give an example of an injective torsion module (over an integral domain).

A torsion module is the one with NO torsion–free elements. You will have to prove that the module you gave is torsion and injective. You may use Baer's criterion without proof, but must state it in its full generality.

Problem 3. Let K be a field and let $R = K[x]/(x^{12})$. Take $M = K[x]/(x^4)$, $N = K[x]/(x^6)$. What is the dimension of $\mathrm{Ext}^1_R(M, N)$ as a K–vector space?