

**MATH 101: GRADUATE LINEAR ALGEBRA
HOMEWORK, DAY #26**

Problem 26.1. Let $A = \begin{pmatrix} -1 & 2 & 1 \\ -1 & 2 & 1 \\ -2 & 4 & 2 \end{pmatrix} \in M_3(\mathbb{Q})$. Then multiplication by A defines a \mathbb{Q} -linear endomorphism of $V = \mathbb{Q}^3$, so equips V with the structure of a (torsion) $\mathbb{Q}[x]$ -module. Decompose V into a direct sum of cyclic $\mathbb{Q}[x]$ -modules with a basis for each.