Problem 1. *Let V be the subspace of M_{23} consisting of all matrices A that satisfy the condition* $A\begin{pmatrix} 3 \\ 3 \\ 4 \end{pmatrix} = \begin{pmatrix} 0 \\ 0 \end{pmatrix}$. *Find a basis for V.*

Problem 2. *Let V be the subset of $\mathbb{P}_3$ consisting of all polynomials p that have the property $p(3) = 2p(-3)+3$. Is V a vector space, if addition and scalar multiplication are the standard ones?*

Problem 3. *Are the following statements true or false? Give a brief reason or a counterexample for each.*

a. *If A is a 3×4 matrix, then the rows of A are linearly independent.*
b. *If A is a 3×3 matrix and the rows of A are linearly dependent, then the columns of A are linearly dependent too.*

Problem 4. *Problem 9 from section 4.7*

Problem 5. *Suppose A is an invertible matrix. Show, that if $\{v_1, v_2, \ldots, v_n\}$ form a basis for $\mathbb{R}^n$, then so do $\{Av_1, Av_2, \ldots, Av_n\}$.*