Problem 1. **(1 point)** Library/NAU/setLinearAlgebra/minpolyFromJ.pg

Find the minimal polynomial $m(x)$ of $\begin{bmatrix} -2 & 1 & 0 & 0 & 0 \\ 0 & -2 & 0 & 0 & 0 \\ 0 & 0 & -2 & 0 & 0 \\ 0 & 0 & 0 & 4 & 0 \\ 0 & 0 & 0 & 0 & 4 \end{bmatrix}$.

$m(x) =$ _____

Answer(s) submitted:

- no response

submitted: (incorrect)
recorded: (incorrect)

Problem 2. **(1 point)** Library/NAU/setLinearAlgebra/JordanBlockSizes.pg

Let λ be an eigenvalue of the linear operator L and define $L_\lambda := L - \lambda I$. The following table lists the nullities of the powers of L_λ.

k	1	2	3
4	5	6	
nullity(L_λ^k)	6	11	16
20	24	27	

Find the sizes of the Jordan blocks corresponding to λ of the Jordan form of the matrix of L as a list of integers.

Sizes: _____

Answer(s) submitted:

- no response

submitted: (incorrect)
recorded: (incorrect)

Problem 3. **(1 point)** Library/NAU/setLinearAlgebra/invariantSmallest.pg

Consider the multiplication operator $L_A : \mathbb{R}^4 \to \mathbb{R}^4$ where

$$A = \begin{bmatrix} -4 & 5 & -2 & -4 \\ -1 & 1 & -1 & -1 \\ 9 & -14 & 2 & 11 \\ 1 & -1 & 0 & 1 \end{bmatrix}.$$

Find a matrix B whose row space is smallest L_A-invariant subspace that contains the vector $(0,0,-1,0)$.

$$B = \begin{bmatrix} \_\_ & \_\_ & \_\_ & \_\_ \\ \_\_ & \_\_ & \_\_ & \_\_ \\ \_\_ & \_\_ & \_\_ & \_\_ \\ \_\_ & \_\_ & \_\_ & \_\_ \end{bmatrix}$$

Answer(s) submitted:

- no response

submitted: (incorrect)
recorded: (incorrect)

Problem 4. **(1 point)** Library/NAU/setLinearAlgebra/minpoly2.pg

Let $V = \mathbb{P}_3[x]$ be the vector space of real polynomials in x with degree less than 3. Let $L : V \to V$ be defined by $L(p(x)) = 3p''(x) - 5p(x)$.

a. Find the characteristic polynomial $f(t)$ of L.

$f(t) =$ _____

b. Find the minimal polynomial $m(t)$ of L.

$m(t) =$ _____

c. Find the minimal polynomial $g(t)$ of L relative to $1+x$.

$g(t) =$ _____

Answer(s) submitted:

- no response
- no response
- no response

submitted: (incorrect)
recorded: (incorrect)