Problema 1. *Rezolvati sistemul:*

$$\begin{cases} x+y-z=1 \\ -2x+3y+z=-1 \\ -x+9y-z=1 \end{cases}$$

1 punct

Problema 2. i) *Aratati ca urmatorii vectori formeaza o baza in* $\mathbb{R}^3$*:*

$B = \{v_1 = (1,-1,2), v_2 = (1,2,3), v_3 = (-1,-1,-1)\}$ $(1p)$

ii) *Aflati coordonatele vectorului* $w = (-1,1,2)$ *in aceasta baza* $(0,5p)$

iii) *Aflati matricea de trecere de la baza* B *la baza canonica* B_c *din* $\mathbb{R}^3$. $(0,5p)$

Problema 3. *Determinati vectorii si valorile proprii corespunzatoare matricei:*

$$N = \begin{pmatrix} -4 & -6 \\ 3 & 5 \end{pmatrix}$$

2 puncte

Problema 4. i) *Aflati transformarea liniara* $T : \mathbb{R}^3 \to \mathbb{R}^3$ *care verifica conditiile:*

$T(1,1,-1) = (0,1,1),\ \ T(1,0,1) = (-1,2,3),\ \ T(1,0,0) = (-2,2,2)$ $(1p)$

ii) *Aflati imaginea lui* $A(2,0,1)$ *prin aceasta transformare.* $(1p)$

Problema 5. *Consideram vectorii* $\bar{u} = (2,1,1), \bar{v} = (-3,1,1)$ *si* $\bar{w} = (-1,0,2)$.

i) *Aratati ca vectorii* $\bar{u}, \bar{v}, \bar{w}$ *sunt necoplanari* $(0,5p)$

ii) *Demonstrati ca are loc identitatea:*

$$\bar{u} \cdot (\bar{v} \times \bar{w}) = -\bar{v} \cdot (\bar{u} \times \bar{w}) \qquad (0,5p)$$

iii) *Aratati ca* $\bar{u}$ *este perpendicular pe* $\bar{w}$ $(0,5p)$

iv) *Aflati unghiul dintre vectorii* $\bar{v}$ *si* $\bar{w}$ $(0,5p)$