Problem 1: Let V be the set of polynomials $V = \{ax^2 + n : a \in \mathbb{R}, n \in \mathbb{Z}\}$. (Recall: $\mathbb{R}$ is the set of real numbers, $\mathbb{Z}$ is the set of integers $(... -2, -1, 0, 1, 2....)$

Is V closed under addition? Why or why not?

Is V closed under scalar multiplication? Why or why not?

Problem 2: Let $a, b, c, d, e, f, g, h, i, j, k, l \in \mathbb{R}$.

Are

$$\begin{pmatrix} a \\ b \\ c \end{pmatrix}, \begin{pmatrix} d \\ e \\ f \end{pmatrix}, \begin{pmatrix} g \\ h \\ i \end{pmatrix}, \begin{pmatrix} j \\ k \\ l \end{pmatrix}$$

linearly independent? Why or why not?