1) [4.3 Q11] Find a basis for the set of vectors in $\mathbb{R}^3$ in the plane $x + 2y + z = 0$

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2) [4.3 Q22,33] (i) A linearly independent set in a subspace H is a basis for H. (ii) Suppose $\mathbb{R}^4 = \text{Span}\{v_1, \ldots, v_4\}$. Explain why $\{v_1, \ldots, v_4\}$ is a basis for $\mathbb{R}^4$.

3) [4.4 Q3] Find the vector x determined by the given coordinate vector $[x]_\mathcal{B}$ and the given basis $\mathbb{B}$.

$$\mathcal{B} = \left\{ \begin{bmatrix} 1 \\ -4 \\ 3 \end{bmatrix}, \begin{bmatrix} 5 \\ 2 \\ -2 \end{bmatrix}, \begin{bmatrix} 4 \\ -7 \\ 0 \end{bmatrix} \right\}, [x]_\mathcal{B} = \begin{bmatrix} 3 \\ 0 \\ -1 \end{bmatrix}$$

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4) [4.4 Q5] Find the coordinate vector $[x]_\mathcal{B}$ of x relative to the given basis $\mathcal{B} = \{b_1, \ldots, b_n\}$.

$$b_1 = \begin{bmatrix} 1 \\ -3 \end{bmatrix}, b_2 = \begin{bmatrix} 2 \\ -5 \end{bmatrix}, x = \begin{bmatrix} -2 \\ 1 \end{bmatrix}$$