COMP408 Assignment #2

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1. [6 points] Show that S = {(2, −2, 5), (−3, 1, 1), (2, 7, −4)} is independent in R^3.

2. Answer the following questions related to the vectors $b_1 = [1, 2, -1]^T$ and $b_2 = [-1, 1, 3]^T$:

   a. [5 points] Show that $\{b_1, b_2\}$ is a basis of $S = \text{Span}\{b_1, b_2\}$.

   b. [3 points] Find the coordinate vector $[x]_B$, where $x = [-1, 7, 7]^T$.

   c. [3 points] Find the vector y, where $[y]_B = [5, -6]^T$.

   d. [2 points] What is the dimension of S?

3. [9 points] Find a basis for each of the spaces null(A), row(A), and col(A), where

$$\mathbf{A} = \begin{bmatrix} 1 & 2 & 5 & 2 & 4 \\ -1 & -2 & -5 & -2 & -3 \\ 0 & 1 & 3 & -2 & 8 \\ 2 & 3 & 7 & 6 & 0 \end{bmatrix}.$$

4. [10 points] Use a least squares solution to find a parabola that best fits the data points (−2, 8), (0, 8), (2, 4), and (2, 17).