Problem 1

Determine if the set of vectors $\begin{bmatrix} x \\ y \\ 3x + 2y \end{bmatrix}$ in $\mathbb{R}^3$ form a vector space (with the usual addition and scalar multiplication for vectors in $\mathbb{R}^3$).

Problem 2

Determine if the set of vectors $\begin{bmatrix} x \\ y \\ 5 \end{bmatrix}$ in $\mathbb{R}^3$ form a vector space (with the usual addition and scalar multiplication for vectors in $\mathbb{R}^3$).

Problem 3

Determine if $\begin{bmatrix} 1 \\ 3 \\ 2 \end{bmatrix}$ is in the span $\left\{ \begin{bmatrix} 2 \\ 1 \\ 0 \end{bmatrix}, \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix} \right\}$.

Problem 4

Determine if $\begin{bmatrix} 1 \\ 3 \\ 2 \end{bmatrix}$ is in the span $\left\{ \begin{bmatrix} 2 \\ 1 \\ 0 \end{bmatrix}, \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}, \begin{bmatrix} 0 \\ 1 \\ 1 \end{bmatrix} \right\}$.