1. Compute the matrix-vector product

\[
\begin{bmatrix}
2 & -3 & 1 \\
-4 & 5 & 0 \\
3 & -1 & 2 \\
\end{bmatrix}
\begin{bmatrix}
1 \\
2 \\
-3 \\
\end{bmatrix}
\]

1. If possible, write the vector

\[
u = \begin{bmatrix}
1 \\
3 \\
4 \\
\end{bmatrix}
\]

as a linear combination of the vectors in \( S \), where

\[
S = \left\{ \begin{bmatrix} 1 \\ 1 \\ 2 \end{bmatrix}, \begin{bmatrix} 0 \\ 1 \\ 1 \end{bmatrix} \right\}
\]