

(1) For each vector \mathbf{v} in (a) and (b), is it in the span of the set $S = \{\mathbf{v}_1, \mathbf{v}_2\}$, where

$$\mathbf{v}_1 = \begin{bmatrix} 1 \\ 0 \\ 1 \end{bmatrix}, \quad \mathbf{v}_2 = \begin{bmatrix} 4 \\ 3 \\ 5 \end{bmatrix} \quad ?$$

(a) $\mathbf{v} = \begin{bmatrix} 2 \\ 3 \\ 2 \end{bmatrix}$.

(b) $\mathbf{v} = \begin{bmatrix} 2 \\ 3 \\ 3 \end{bmatrix}$.

(2) Find all vectors in the span of S of Exercise (1).

(3) Is the set X in each part linearly independent? If it is not, find a linear dependence of the vectors in X .

(a) $X = \left\{ \begin{bmatrix} 2 \\ 1 \end{bmatrix}, \begin{bmatrix} 1 \\ 2 \end{bmatrix} \right\}$.

(b) $X = \left\{ \begin{bmatrix} 1 \\ 2 \end{bmatrix}, \begin{bmatrix} 2 \\ 3 \end{bmatrix}, \begin{bmatrix} 3 \\ 4 \end{bmatrix} \right\}$.