1.4.14 Correction

$\vec{v}_1 = \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix} \quad v_2 = \begin{bmatrix} -3 \\ 0 \\ 2 \end{bmatrix}$

$W = \text{span}\{\vec{v}_1, \vec{v}_2\}$

Two vectors in $\mathbb{R}^3$ create a plane if they are independent of each other and a line if they are dependent.

We can check their dependence by solving:

$$c_1\vec{v}_1 + c_2\vec{v}_2 = 0$$

If there exists a set of scalars that make this system true that are not the trivial solution then the vectors are dependent.

$$\left[\begin{array}{cc|c} 1 & -3 & 0 \\ 1 & 0 & 0 \\ 1 & 2 & 0 \end{array}\right] \Rightarrow \text{RREF} \Rightarrow \left[\begin{array}{cc|c} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 0 \end{array}\right] \Rightarrow \begin{matrix} x_1 = 0 \\ x_2 = 0 \end{matrix}$$

$\boxed{\text{The vectors are independent but only create a plane in } \mathbb{R}^3\text{.}}$

The vectors are independent but only create a plane in $\mathbb{R}^3$. You need three independent vectors to span $\mathbb{R}^3$. In conclusion, no.

A vector not in W would be: $\begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}$

$$\left[\begin{array}{cc|c} 1 & -3 & 0 \\ 1 & 0 & 0 \\ 1 & 2 & 1 \end{array}\right] \Rightarrow \text{RREF} \Rightarrow \left[\begin{array}{cc|c} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{array}\right]$$

$0 \neq 1$

Inconsistent