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2a. $\begin{bmatrix} 2 & 2 & 7 \\ 0 & 2 & 1 \\ 3 & -14 & 2 \end{bmatrix}\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} a \\ b \\ c \end{bmatrix}$ $\begin{vmatrix} 2 & 2 & 7 \\ 0 & 2 & 1 \\ 3 & -14 & 2 \end{vmatrix} = 2(4+14)-2(-3)+7(-6)$
$= 36+6+42 = 42-42 = 0$

$\frac{3}{2}R_1 = R_1 \rightarrow \begin{bmatrix} 3 & 3 & 21/2 \\ 0 & 2 & 1 \\ 3 & -14 & 2 \end{bmatrix} \rightarrow R_1 = R_1 - \frac{17}{2}R_2 \begin{bmatrix} 3 & -14 & 2 \\ 0 & 2 & 1 \\ 3 & -14 & 2 \end{bmatrix}$

$\begin{bmatrix} a \\ b \\ c \end{bmatrix} \longrightarrow \begin{bmatrix} \frac{3}{2}a \\ b \\ c \end{bmatrix} \longrightarrow \begin{bmatrix} \frac{3}{2}a - \frac{17}{2}b \\ b \\ c \end{bmatrix}$

If $\frac{3}{2}a - \frac{17}{2}b = c$, A has infinite solutions. If $\frac{3}{2}a - \frac{17}{2}b \neq c$, A has no solutions.

$3a - 17b = 2c$ $a=7$ $b=1$ $c=2$ ← infinite solution

$3(7) - 17(1) = 2c$
$21 - 17 = 2c$
$c = 2$

$\vec{V} = \begin{bmatrix} 7 \\ 1 \\ \text{NOT } 3 \end{bmatrix} = \begin{bmatrix} 7 \\ 1 \\ 1 \end{bmatrix}$

b. Same reasoning as above.

$\vec{w} = \begin{bmatrix} 7 \\ 1 \\ 3 \end{bmatrix}$