C12† Solve the given vector equation for α, or explain why no solution exists:

$$\alpha \begin{bmatrix} 1 \\ 2 \\ -1 \end{bmatrix} + 4 \begin{bmatrix} 3 \\ 4 \\ 2 \end{bmatrix} = \begin{bmatrix} -1 \\ 0 \\ 4 \end{bmatrix}$$

$$\alpha \begin{bmatrix} 1 \\ 2 \\ -1 \end{bmatrix} + \begin{bmatrix} 4(3) \\ 4(4) \\ 4(2) \end{bmatrix} = \begin{bmatrix} -1 \\ 0 \\ 4 \end{bmatrix}$$

$$\alpha \begin{bmatrix} 1 \\ 2 \\ -1 \end{bmatrix} + \begin{bmatrix} 12 \\ 16 \\ 8 \end{bmatrix} = \begin{bmatrix} -1 \\ 0 \\ 4 \end{bmatrix}$$

$$\alpha \begin{bmatrix} 1 \\ 2 \\ -1 \end{bmatrix} = \begin{bmatrix} -1 \\ 0 \\ 4 \end{bmatrix} - \begin{bmatrix} 12 \\ 16 \\ 8 \end{bmatrix}$$

$$\alpha \begin{bmatrix} 1 \\ 2 \\ -1 \end{bmatrix} = \begin{bmatrix} -13 \\ -16 \\ -4 \end{bmatrix}$$

If α = -13, then . . . the equation would only be partially correct, which means it can never be solved:

$$-13 \begin{bmatrix} 1 \\ 2 \\ -1 \end{bmatrix} + 4 \begin{bmatrix} 3 \\ 4 \\ 2 \end{bmatrix} = \begin{bmatrix} -1 \\ 0 \\ 4 \end{bmatrix}$$

$$\begin{bmatrix} -13(1) \\ -13(2) \\ -13(-1) \end{bmatrix} + 4 \begin{bmatrix} 3 \\ 4 \\ 2 \end{bmatrix} = \begin{bmatrix} -1 \\ 0 \\ 4 \end{bmatrix}$$

$$\begin{bmatrix} -13 \\ -26 \\ 13 \end{bmatrix} + \begin{bmatrix} 4(3) \\ 4(4) \\ 4(2) \end{bmatrix} = \begin{bmatrix} -1 \\ 0 \\ 4 \end{bmatrix}$$

$$\begin{bmatrix} -13 \\ -26 \\ 13 \end{bmatrix} + \begin{bmatrix} 12 \\ 16 \\ 8 \end{bmatrix} = \begin{bmatrix} -1 \\ 0 \\ 4 \end{bmatrix}$$

$$\begin{bmatrix} -1 \\ -10 \\ 21 \end{bmatrix} = \begin{bmatrix} -1 \\ 0 \\ 4 \end{bmatrix}$$

Since the top row is equivalent but the rest are not, no value for α would make this equation true. For example, -8 and 4 would also both make one row equivalent, but the entire equation would still be inequal.