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These solutions are not the only "perfect" or "10/10" solutions to be followed as a model. They are examples of ways to solve these problems. There are many many alternative ways to solve these problems. We hope that these example solutions help you check your work.

Problems

Q1. Determine if $\mathbf{v}_1$ can be written as a linear combination of $\mathbf{v}_2$ and $\mathbf{v}_3$ for the following $\{\mathbf{v}_1, \mathbf{v}_2, \mathbf{v}_3\}$. If it it is possible to write $\mathbf{v}_1$ as a linear combination of $\mathbf{v}_2$ and $\mathbf{v}_3$, give the linear combination. If it it is impossible, justify why it is impossible.

(a)

$$\mathbf{v}_1 = (-2, 0, 3) \quad \mathbf{v}_2 = (1, 3, 0) \quad \mathbf{v}_3 = (2, 4, -1)$$

Solution: Let's assume that a and b are real numbers such that

$$\begin{pmatrix} -2 \\ 0 \\ 3 \end{pmatrix} = a \begin{pmatrix} 1 \\ 3 \\ 0 \end{pmatrix} + b \begin{pmatrix} 2 \\ 4 \\ -1 \end{pmatrix}$$