Vectors Q5 (3/7/23)

Given that the line $\underline{r} = \begin{pmatrix} 2 \\ 3 \end{pmatrix} + \lambda \begin{pmatrix} 1 \\ -2 \end{pmatrix}$ can also be written as

$\begin{pmatrix} 0 \\ 7 \end{pmatrix} + \mu \begin{pmatrix} -1 \\ 2 \end{pmatrix}$, find μ in terms of λ

Solution

$$\begin{pmatrix}0\\7\end{pmatrix}+\mu\begin{pmatrix}-1\\2\end{pmatrix}=\begin{pmatrix}2\\3\end{pmatrix}+\begin{pmatrix}-2\\4\end{pmatrix}+\mu\begin{pmatrix}-1\\2\end{pmatrix}$$

$$=\begin{pmatrix}2\\3\end{pmatrix}+2\begin{pmatrix}-1\\2\end{pmatrix}+\mu\begin{pmatrix}-1\\2\end{pmatrix}$$

$$=\begin{pmatrix}2\\3\end{pmatrix}+(2+\mu)\begin{pmatrix}-1\\2\end{pmatrix}$$

Thus $2+\mu=-\lambda$, and so $\mu=-\lambda-2$