Further Maths Core Pure 1 Vectors

Find a vector perpendicular to both $\begin{pmatrix}1\\3\\7\end{pmatrix}$ and $\begin{pmatrix}2\\1\\5\end{pmatrix}$ without using the vector product.

Let the vector be $\begin{pmatrix}1\\a\\b\end{pmatrix}$

$$\begin{pmatrix}1\\3\\7\end{pmatrix}.\begin{pmatrix}1\\a\\b\end{pmatrix} = 1 + 3a + 7b = 0$$

$$\begin{pmatrix}2\\1\\5\end{pmatrix}.\begin{pmatrix}1\\a\\b\end{pmatrix} = 2 + a + 5b = 0$$

$$3a + 7b = -1$$
$$a + 5b = -2$$

$$a = \frac{9}{8} \qquad b = -\frac{5}{8}$$

A vector perpendicular to both given vectors is $\begin{pmatrix}1\\\frac{9}{8}\\-\frac{5}{8}\end{pmatrix}$ or $\begin{pmatrix}8\\9\\-5\end{pmatrix}$