HL

A line L passes through the points A(1,-1,3) and B(3,-4,4)

Point C (x,y,1) also lies on the line L. Find x and y.

$\vec{AB} = \vec{OB} - \vec{OA}$

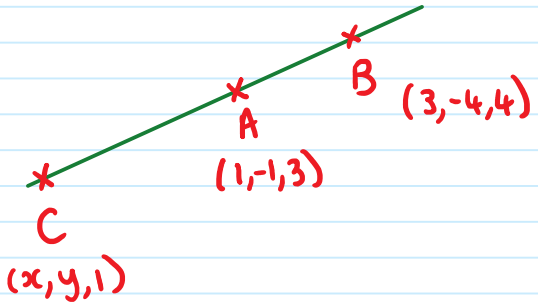
$\vec{AB} = \begin{pmatrix}3\\-4\\4\end{pmatrix} - \begin{pmatrix}1\\-1\\3\end{pmatrix} = \begin{pmatrix}2\\-3\\1\end{pmatrix}$

$\underline{r} = \underline{a} + \lambda\underline{b}$

$\underline{r} = \begin{pmatrix}1\\-1\\3\end{pmatrix} + \lambda\begin{pmatrix}2\\-3\\1\end{pmatrix}$

Note that other answers are possible

e.g. $\underline{r} = \begin{pmatrix}3\\-4\\4\end{pmatrix} + \lambda\begin{pmatrix}2\\-3\\1\end{pmatrix}$



A certain value of λ will define the position of $\vec{OC}$

$\begin{pmatrix}1\\-1\\3\end{pmatrix} + \lambda\begin{pmatrix}2\\-3\\1\end{pmatrix} = \begin{pmatrix}x\\y\\1\end{pmatrix}$

$3 + \lambda = 1$

$\lambda = -2$

$1 + 2\lambda = x$

$1 - 4 = x$

$x = -3$

$-1 - 3\lambda = y$

$-1 + 6 = y$

$y = 5$