2 The points O and A have position vectors $\begin{pmatrix}0\\0\\0\end{pmatrix}$ and $\begin{pmatrix}6\\0\\8\end{pmatrix}$ respectively. The point P is such that $\overrightarrow{OP} = k\overrightarrow{OA}$, where k is a non-zero constant.

(a) Find, in terms of k, the length of OP. **[1]**

Point B has position vector $\begin{pmatrix}1\\2\\3\end{pmatrix}$ and angle OPB is a right angle.

(b) Determine the value of k. **[4]**