7 The position vectors of the points A and B, relative to an origin O, are given by

$$\overrightarrow{OA} = \begin{pmatrix} 1 \\ 0 \\ 2 \end{pmatrix} \quad \text{and} \quad \overrightarrow{OB} = \begin{pmatrix} k \\ -k \\ 2k \end{pmatrix},$$

where k is a constant.

(i) In the case where $k = 2$, calculate angle AOB. [4]

(ii) Find the values of k for which $\overrightarrow{AB}$ is a unit vector. [4]