5 **(a)** Find the vector which is in the opposite direction to $\begin{pmatrix} 15 \\ -8 \end{pmatrix}$ and has a magnitude of 8.5. [2]

(b) Find the values of a and b such that $5\begin{pmatrix} 3a \\ b \end{pmatrix} + \begin{pmatrix} 2a+1 \\ 2 \end{pmatrix} = 6\begin{pmatrix} b+a \\ 2 \end{pmatrix}$. [3]

6 **(a)** Write down the values of k for which the line $y = k$ is a tangent to the curve $y = 4\sin\left(x + \frac{\pi}{4}\right) + 10$. [2]

© UCLES 2022