9 **(a)** Find the unit vector in the direction of $40\mathbf{i} - 9\mathbf{j}$. [2]

(b) The position vectors of points P and Q relative to an origin O are $\mathbf{p}$ and $\mathbf{q}$ respectively. The point R lies on the line PQ and is between P and Q such that $\frac{PR}{PQ} = k$.

(i) Write down the set of all possible values of k. [1]

(ii) Given that the position vector of R relative to O is $\lambda\mathbf{p} + \mu\mathbf{q}$ show that $\lambda + \mu = 1$. [3]