2 The points A, B and C have position vectors $3\mathbf{i} - 4\mathbf{j} + 2\mathbf{k}$, $-\mathbf{i} + 6\mathbf{k}$ and $7\mathbf{i} - 4\mathbf{j} - 2\mathbf{k}$ respectively. M is the midpoint of BC.

(a) Show that the magnitude of $\overrightarrow{OM}$ is equal to $\sqrt{17}$. **[2]**

Point D is such that $\overrightarrow{BC} = \overrightarrow{AD}$.

(b) Show that position vector of the point D is $11\mathbf{i} - 8\mathbf{j} - 6\mathbf{k}$. **[3]**