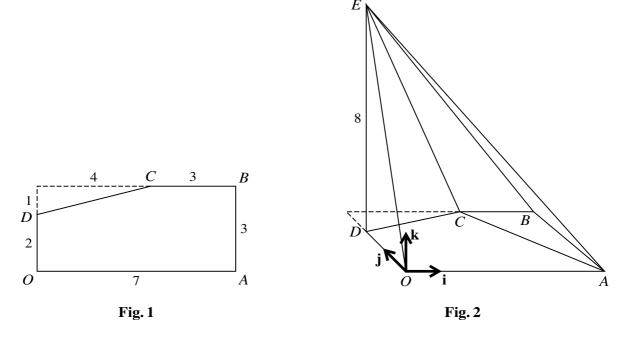Fig. 1

Fig. 2

Fig. 1 shows a rectangle with sides of 7 units and 3 units from which a triangular corner has been removed, leaving a 5-sided polygon $OABCD$. The sides OA, AB, BC and DO have lengths of 7 units, 3 units, 3 units and 2 units respectively. Fig. 2 shows the polygon $OABCD$ forming the horizontal base of a pyramid in which the point E is 8 units vertically above D. Unit vectors $\mathbf{i}$, $\mathbf{j}$ and $\mathbf{k}$ are parallel to OA, OD and DE respectively.

(i) Find $\overrightarrow{CE}$ and the length of CE. [3]

(ii) Use a scalar product to find angle ECA, giving your answer in the form $\cos^{-1}\left(\dfrac{m}{\sqrt{n}}\right)$, where m and n are integers. [5]

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