The diagram shows a three-dimensional shape in which the base *OABC* and the upper surface *DEFG* are identical horizontal squares. The parallelograms *OAED* and *CBFG* both lie in vertical planes. The point *M* is the mid-point of *AF*.

Unit vectors **i** and **j** are parallel to *OA* and *OC* respectively and the unit vector **k** is vertically upwards. The position vectors of *A* and *D* are given by $\overrightarrow{OA} = 8\mathbf{i}$ and $\overrightarrow{OD} = 3\mathbf{i} + 10\mathbf{k}$.

  (i) Express each of the vectors $\overrightarrow{AM}$ and $\overrightarrow{GM}$ in terms of **i**, **j** and **k**.   [3]

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(ii) Use a scalar product to find angle *GMA* correct to the nearest degree. [4]

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