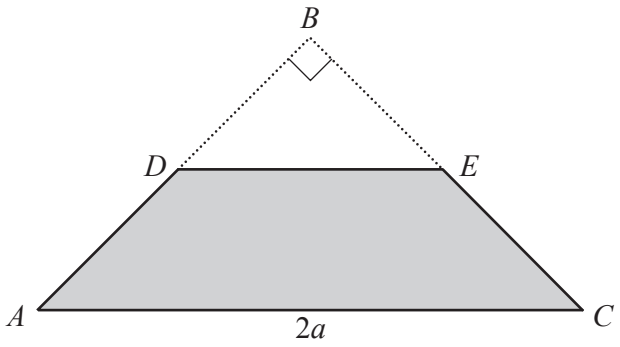
3



A uniform lamina is in the form of an isosceles triangle ABC in which $AC = 2a$ and angle $ABC = 90°$. The point D on AB is such that the ratio $DB : AB = 1 : k$. The point E on CB is such that DE is parallel to AC. The triangle DBE is removed from the lamina (see diagram).

(a) Find, in terms of k, the distance of the centre of mass of the remaining lamina $ADEC$ from the midpoint of AC. [4]

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When the lamina $ADEC$ is freely suspended from the vertex A, the edge AC makes an angle θ with the downward vertical, where $\tan\theta = \frac{5}{18}$.

(b) Find the value of k. [3]