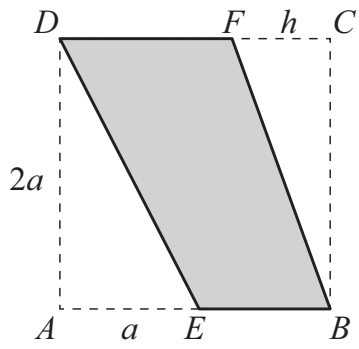
3



The lamina *BFDE* is obtained by removing triangles *AED* and *BCF* from a uniform square lamina *ABCD* of side $2a$. The length of side *AE* is a and the length of side *FC* is h (see diagram). The centre of mass of *BFDE* is at a distance $\overline{x}$ from *AD*, and at a distance $\overline{y}$ from *AB*.

(a) Show that $\overline{x} = \dfrac{h^2 - 6ah + 11a^2}{3(3a - h)}$ and find a corresponding expression for $\overline{y}$. [5]

(b) The lamina *BFDE* is placed vertically on its edge *EB* on a smooth horizontal surface.

Find, in terms of a, the set of possible values of h for which the lamina remains in equilibrium. [2]