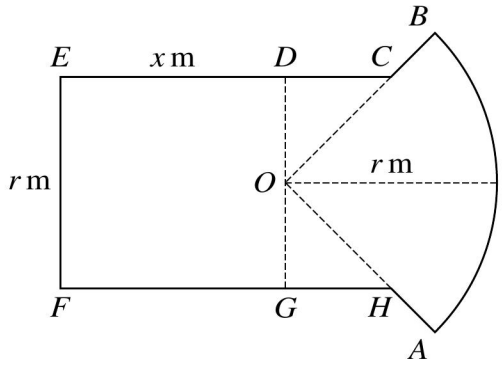


The diagram shows a uniform lamina $ABCDEFGH$. The lamina consists of a quarter-circle $OAB$ of radius $r$ m, a rectangle $DEFG$ and two isosceles right-angled triangles $COD$ and $GOH$. The rectangle has $DG = EF = r$ m and $DE = FG = x$ m.

**(i)** Given that the centre of mass of the lamina is at $O$, express $x$ in terms of $r$. [6]

**(ii)** Given instead that the rectangle $DEFG$ is a square with edges of length $r$ m, state with a reason whether the centre of mass of the lamina lies within the square or the quarter-circle. [1]