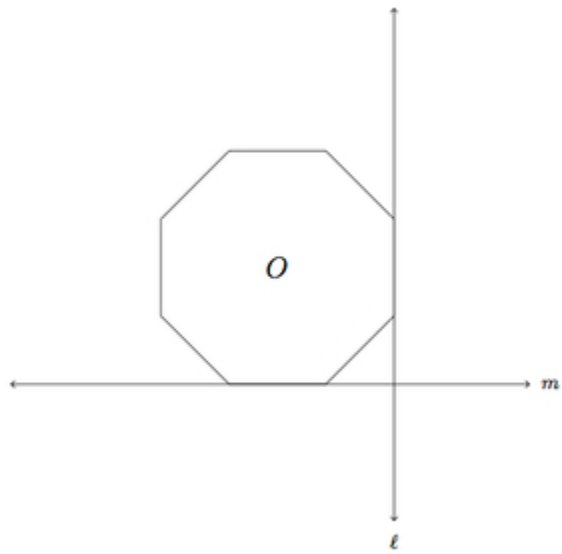
Building a tile pattern by reflecting octagons

Task
Below is a picture of a regular octagon, which we denote by O, and two lines denoted ℓ and m, each containing one side of the octagon:



a. Draw $r_\ell(O)$, the reflection of the octagon about ℓ.

b. Draw $r_m(O)$ and $r_m\big(r_\ell(O)\big)$, the reflections of the two octagons from part (a) about line m.

c. Show that the quadrilateral enclosed by the four octagons O, $r_\ell(O)$, $r_m(O)$, and $r_m\big(r_\ell(O)\big)$ found in parts (a) and (b) is a square.