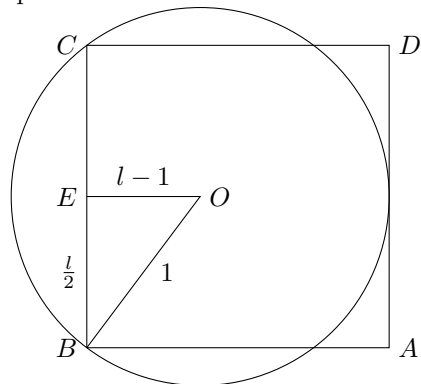


Solution:

Problem 4 of the 2016–2017 Scottish Mathematical Council Mathematical Challenge, Middle division which appeared in Crux Mathematicorum at [2017:87] . We present the solution by Andrea Fanchini, that appeared at [2018:95].

Let l be the side of the square and let O be the centre of the circle. Drop the perpendicular OE on the side BC .



We know that $BE = \frac{l}{2}$, $BO = 1$ and $OE = l - 1$. Therefore, by Pythagoras' Theorem we have

$$1 = \frac{l^2}{4} + (l - 1)^2$$

and hence

$$5l^2 - 8l = 0.$$

This gives $l = 0$ or $l = \frac{8}{5}$. Therefore, as a length, $l = \frac{8}{5}$.

This means that the area of the square is

$$l^2 = \frac{64}{25}.$$