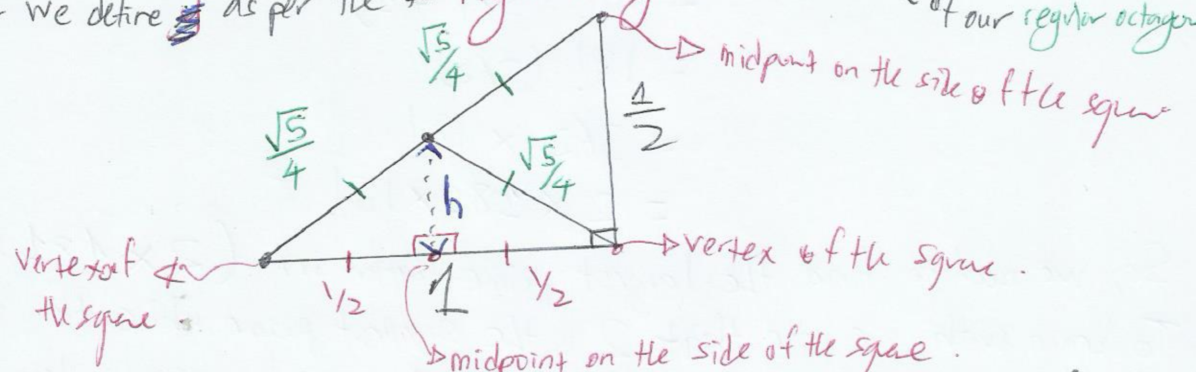
Muda.

(B1) Note that the shaded region is a regular octagon (by symmetry)

We exploit the symmetry of the regular octagon ~~in 2 ways~~:

Firstly define: ~~x = side of the regular octagon~~ r = radius of the excircle or the circumscribing circle of the regular octagon.

Next we define h (height) as per the right triangle below (found at the corners of our regular octagon)



*Note that our square which has an area of 1 also has a side of 1.

By applying Phythagoras theorem $\left(\left(\frac{1}{2}\right)^2+1^2=\left(\frac{\sqrt5}{4}+\frac{\sqrt5}{4}\right)^2\right)$ to the larger right triangle, we obtain the value $\frac{\sqrt5}{4}$.

Now, by applying Phythagoras Theorem on the smaller right triangle (with leg h), we obtain: $h^2+\left(\frac{1}{2}\right)^2=\left(\frac{\sqrt5}{4}\right)^2 \rightsquigarrow$ Solve to get: $\boxed{h=\frac{1}{4}}$

We also the diameter of the regular octagon which is both parallel and equal to the side (length = 1) of the square as follows:

Note that: $\frac{180°}{4}=45°$

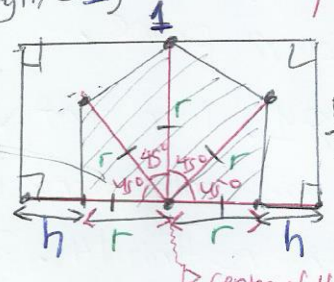


Diagram shows "half" the square. (not to scale). A rectangle is formed. [half of the regular octagon is inside]

Comparing the top and bottom sides of this rectangle, (which are equal), we get:

use here! $h+r+r+h=1 \rightarrow r=\frac{1}{2}-h \rightarrow r=\frac{1}{2}-\frac{1}{4} \rightarrow \boxed{r=\frac{1}{4}}$

Finally we note that our regular octagon is made up of 8 congruent isosceles triangles: (r, 45°, r) where Each of these triangle has an Area, $A=\frac{1}{2}r^2\sin 45°$ (use here)

$A=\frac{1}{2}\times\left(\frac{1}{4}\right)^2\times\left(\frac{1}{\sqrt2}\right)$

$\Rightarrow A=\frac{1}{32\sqrt2} \rightarrow$ Area of regular octagon $=8A=\frac{1}{4\sqrt2}$

(Pg 14) Thus $\boxed{\text{Answer}: \frac{1}{4\sqrt2}}$