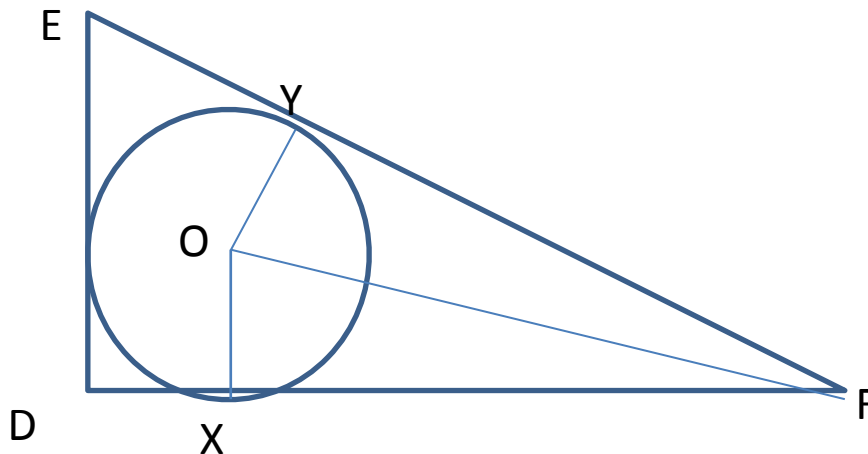


April 11th

In the triangle DEF, DE = 9cm, DF = 40cm and EF = 41cm.

Find the area of the inscribed circle of this triangle.



This solution relies on realising that the quadrilateral FXOY is a kite

(Since $OY = OX = r$ and $\text{angle } OYF = \text{angle } OXF = 90^\circ$)

Therefore angle OXF is $\frac{1}{2}$ of angle EFD

$$\text{EFD} = \tan^{-1} \frac{9}{40} = 12.68\dots^\circ$$

Therefore $\text{OXF} = 6.34\dots^\circ$

In triangle OXF:

$$\text{OX} = r \qquad \text{FX} = 40 - r \qquad \tan \text{OXF} = \frac{1}{9}$$

$$\text{Therefore} \qquad \frac{1}{9} = \frac{r}{40 - r}$$

$$\text{Hence} \qquad 40 - r = 9r$$

$$\text{Which gives} \qquad r = 4$$

Therefore area = **$16\pi \approx 50.3 \text{ cm}^2$**