4th-exercise:

1) Reproduced.

2a) In ΔOCF we have:

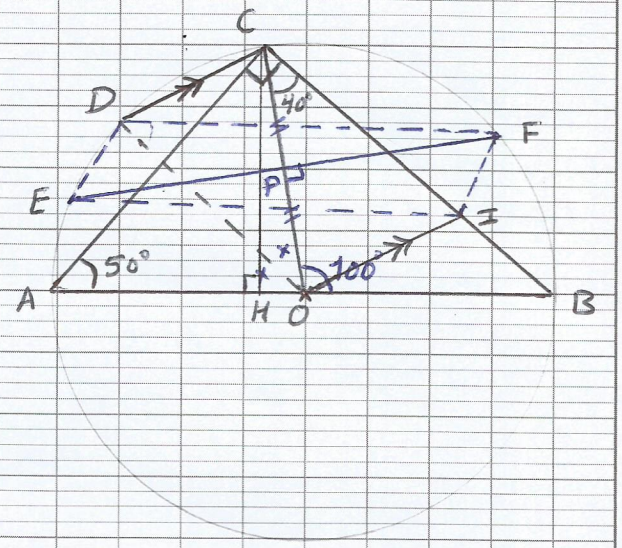
$OC = OF$ (radii of (C))

(FE) is the perp. bisector of [OC] (given)

then, $FC = FO$.

hence, $FC = FO = OC$ (by comparison)

Thus, OCF is equilateral (having 3 equal sides).



b). 1st-Method:

$FP = \frac{\sqrt{3}}{2} \times$ side (height of an equilateral triangle).

So, $FP = \frac{\sqrt{3}}{2} \times OF$

Thus, $FP = 2\sqrt{3}$ cm.

2nd-Method:

(FP) is a bisector of $C\hat{F}O$ (height in an equilateral Δ)

but $C\hat{F}O = 60°$ (angle formed by sides of an equi Δ)

then, $P\hat{F}O = 30°$.

& (FP) $\perp$ (CO) at P (given)

then FPO is right at P.

$\cos P\hat{F}O = \frac{\text{adj}}{\text{hyp}}$

$\cos 30° = \frac{FP}{FO}$

$\frac{\sqrt{3}}{2} = \frac{FP}{4}$

Thus, $FP = 2\sqrt{3}$ cm

c) $B\hat{O}C = 100°$ (given)

then, $C\hat{O}A = 180° - B\hat{O}C$ (sum of central angles formed by a diameter).

So, $C\hat{O}A = 80°$.

Thus, $Area_{AOC} = \frac{AO \times OC \times \sin A\hat{O}C}{2}$

$= \frac{4 \times 4 \sin 80°}{2}$

$Area_{AOC} = 8 \sin 80°$