2) a _ * In Δ AOE we have:
[OA] is perp. to [AE] at A (proved)
hence, AOE is right at A
_ OE = a } (given)
OA = R }
but $R = \frac{a}{2}$ (proved)

then, $OA = \frac{1 OE}{2}$

thus, AOE is semi-equilateral Δ at A. (hyp = 2 smallest side)

b * $AE = \frac{\sqrt{3}}{2} \times hyp$ (side facing 60° of a semi-equi Δ)

$= \frac{\sqrt{3}}{2} \times OE$

$AE = \frac{\sqrt{3}a}{2}$ cm

b * [EA) & [EC) are tangents to (C) at A & C respectively (given)
[FB) & [FC) are tangents to (C) at B & C respectively (given)
so, 2 tangents are issued from each pt. E & F to (C).
* In Δ EOF we have:
_ E is the pt. of intersection of the 2 tangents [EA) & [EC) (given)
O is the center of (C) (given)
then, [EO) is the bisector of $\widehat{AEC}$ (tangent theorem: 1 st. line joining pt. of intersection of the 2 tangents & the center is the bisector of the angle formed by the 2 tangents)
_ F is the pt. of intersection of the 2 tangents [FC) & [FB) (given)
O is the center of (C) (given)