5^{th}-exercise:

1) Drawn ✓

2) $\overset{\frown}{DC} = 60°$ (given)

So, $D\hat{A}C = \dfrac{mes\ \overset{\frown}{DC}}{2} = 30°$ (Inscribed angle facing arc $\overset{\frown}{DC}$)

I is orthogonal projection of D on [AC] (given)

So, $D\hat{I}A = 90°$.

Hence, $A\hat{D}I = 90° - I\hat{A}D$ (sum of base angles in right $\triangle ADI$).

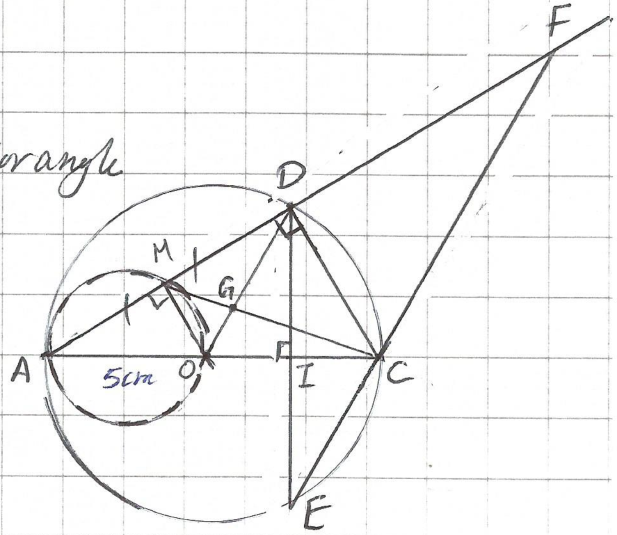
$\boxed{A\hat{D}I = 60°}$

Now, $\overset{\frown}{AE} = 2\ mes\ A\hat{D}E$

$= 120°$

So, $A\hat{F}E = \dfrac{mes(\overset{\frown}{AE} - \overset{\frown}{DC})}{2}$ (Exterior angle

$\boxed{A\hat{F}E = 30°}$



In $\triangle OAD$ we have

$OA = OD$ (radii of (C))

$O\hat{A}D = 30°$ (proved)

So, $O\hat{D}A = 30°$ (base angles of iso $\triangle AOD$ at O)

Hence, $A\hat{D}O = A\hat{F}E = 30°$

Thus, (OD) is parallel to (FE) (st. lines held by equal corresponding ∢'s)

→ In $\triangle ACF$ we have:

O is center of (C) with diameter [AC] (given)

So, O is midpt of [AC]

(OD) // (FC) (proved)