3) Area of (C) $= \pi r^2$
$= \pi (OA)^2$
$= \pi \left(\frac{5\sqrt{2}}{2}\right)^2$
$= \frac{25\pi}{2}$ cm^2.

$r \equiv$ radius of (C)
$AB = 5$cm (given)
$OA = \frac{\sqrt{2}}{2} \times hyp$ (leg of a right isu. Δ)
$OA = \frac{\sqrt{2}}{2} \times (AB)$
$= \frac{5\sqrt{2}}{2}$ cm

4). a) Done ✓
b). H is the orth. proj of I on (OA) (given)
then, (IH) $\perp$ (OA)
& Δ AOB is right at O. (given)
So, (AO) $\perp$ (OB)
Thus, (IH) is parallel (OB) (Two st. lines perp to same st. line in plane are parallel).

5) In Δ AHI & AOB sharing same vertex A. we have:
(HI) // (OB) (proved)
A, H & O are collinear
A, I & B " " in this order
Then, use Thales' property: (If a st. line is drawn parallel to a side of a Δ then it cuts other sides proportionally)
Thales' ratios:
$\frac{AI}{AB} = \frac{AH}{AO} = \frac{IH}{BO} = cst$
① ② ③
Using ratios ① & ②
$\frac{AI}{AB} = \frac{AH}{AO}$

$\frac{1}{\cancel{5}} = \frac{AH}{\cancel{5}\frac{\sqrt{2}}{2}}$.

Thus, $\boxed{AH = \frac{\sqrt{2}}{2} \text{ cm}}$.
Using ① & ③
$\frac{1}{5} = \frac{IH}{\frac{5\sqrt{2}}{2}}$
Thus, $\boxed{IH = \frac{\sqrt{2}}{2} \text{ cm}}$

6). (HI) $\perp$ (AO) proved.
So, $I\hat{H}O = 90°$.
F is diametrically opp. to A (given)
Then, B is on (C) of diameter [AF]
Then, $I\hat{B}F = 90°$.
hence, sum of opposite angles in quad. HIBF is 180°.
Thus, pts H, I, B & F belong to same circle of diameter [IF].

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