c). A belongs to x-axis (given)
B belongs to y-axis
x & y axes are perp. (orthonormal system)
then, $\hat{AOH} + \hat{HOB} = 90°$.
but, $\hat{HBO} + \hat{HOB} = 90°$ (base angles in right $\triangle$ OBH)
Thus $\boxed{\hat{AOH} = \hat{HBO}}$ (Two angles having the same complement are equal).

d). $\cos \hat{AOH} = \frac{OH}{OA}$; $\sin \hat{OBH} = \frac{OH}{OB}$ (proved)

and $\hat{AOH} = \hat{OBH} = \alpha$. (given)
then,

$$\cos\alpha = \frac{OH}{OA} \quad \& \quad \sin\alpha = \frac{OH}{OB}.$$

but, $\cos^2\alpha + \sin^2\alpha = 1$

$$So, \left(\frac{OH}{OA}\right)^2 + \left(\frac{OH}{OB}\right)^2 = 1$$

$$\left(\frac{OH^2}{4} + \frac{OH^2}{16} = 1\right) \times 16$$

$$5OH^2 = 16$$

$$OH = \mp\frac{4}{\sqrt{5}}$$ (OH represents a side)

Thus, $OH = \frac{4\sqrt{5}}{5}$ cm.

4a. $\tan O\hat{A}B = $ Slope of (d)
$\tan O\hat{A}B = 2$
$O\hat{A}B = \tan^{-1}(2)$
$= 63.434...$
$\simeq 63.43°$ (to nearest 10^{-2})