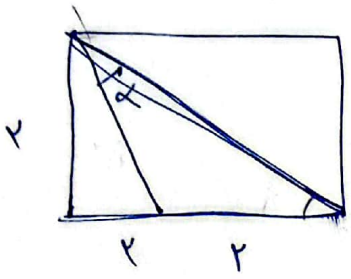
$S = \frac{1}{2} \times 2 \times 2\sqrt{3} \times \sin\alpha = \frac{9}{2} \rightarrow \sin\alpha = \frac{9}{4\sqrt{3}}$ ①

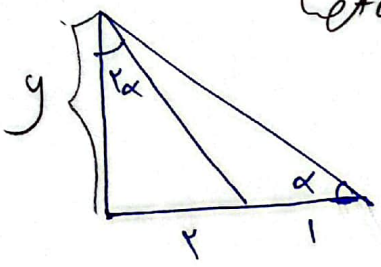
$\frac{\sqrt{3}}{2} \Big/ \begin{matrix} \alpha = 120 \\ \alpha = 60 \end{matrix}$ ②

④



$\tan(\alpha + 45) = \frac{\tan\alpha + 1}{-\tan + 1} = 2 \rightarrow \cot\alpha = 3$

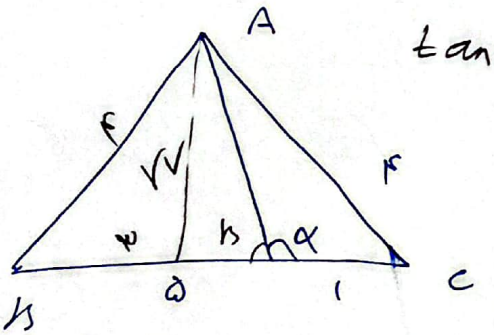
③



$\cot\alpha = \frac{3}{y}$ $\quad \cot 2\alpha = \frac{\cot^2\alpha - 1}{2\cot\alpha} = \frac{(\frac{3}{y})^2 - 1}{2 \times \frac{3}{y}} = \frac{y}{2}$

$9 - y^2 = 3y^2 \rightarrow y = \frac{3\sqrt{2}}{2} \rightarrow \cot\alpha = 2$

⑤



$\tan\alpha = -\tan B = -\frac{\sqrt{7}}{2}$

$2\sin^2 + \cos^2 = \frac{6}{3} \quad + \cos^2 \rightarrow 2\sin^2 + 2\cos^2 - \cos^2 = \frac{6}{3} \rightarrow \cos^2 = \frac{2}{3}$

$\tan^2 = \frac{1}{2}$

$\sin^2 = \frac{1}{3}$

(۶)

$$\frac{\sin^4 + 4\cos^2 + 3}{1+\cos^2} - \frac{\cos^4 + 4\sin^2 - 3}{1+\sin^2} \Rightarrow 2 - \sin^2\alpha - 4\cos^2\alpha = \cos 2\alpha$$

(۷)

$$\tan\alpha = \frac{3}{4} \qquad \pi < \alpha < \frac{3\pi}{2}$$

$$1+\tan^2 = \frac{1}{\cos^2} \rightarrow \cos = -\frac{4}{5} \rightarrow \sin = -\frac{3}{5}$$

$$\sin\left(\frac{9\pi}{2}+\alpha\right)\cos\left(\frac{7\pi}{2}-\alpha\right) - \tan(\alpha - \pi) = -\cos\alpha \times \sin\alpha + \cot\alpha$$

$$-\frac{12}{25} + \frac{3}{4} = \frac{48+75}{100} = 0/48$$

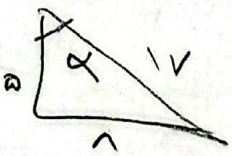
(۱)

$$3\cos 5\pi + \sqrt{2}\sin\pi - \sqrt{2}\cos\pi \rightarrow \frac{\sqrt{3}}{2} - \frac{\sqrt{2}}{2} - 1 + 1/5 = -0/5$$

$$\sqrt{2}\sin\left(\frac{\pi}{3} - \frac{\pi}{4}\right) = \sin\frac{\pi}{3} - \cos\frac{\pi}{3} \rightarrow \sqrt{2}\cos\frac{\pi}{12} = \sqrt{2}\sin\frac{5\pi}{12} \rightarrow \sin\frac{\pi}{2} + \cos\frac{\pi}{3}$$

(۹)

$$\tan\left(\frac{\alpha}{2}\right) = \frac{1}{4} \qquad \frac{\tan\alpha - \sin\alpha}{\sin\alpha - \cos\alpha} =$$



$$\tan\alpha = \tan\left(\frac{\alpha}{2} + \frac{\alpha}{2}\right) = \frac{\frac{1}{4}+\frac{1}{4}}{-\frac{1}{17}+1} = \frac{8}{15}$$

$$\frac{\frac{8}{15} - \frac{8}{17}}{\frac{8}{17} - \frac{15}{17}} = \frac{14}{-105}$$

(۱۰)

$$\sin\alpha < \sin\alpha\cos\alpha \rightarrow \begin{cases} \sin\alpha < 0 \rightarrow \cos < 1 \rightarrow \sin\alpha < 0 \quad * \\ \sin\alpha > 0 \rightarrow \cos\alpha > 1 \quad \times \end{cases}$$

$$\frac{\cos\alpha}{\sin^2\alpha} > 0 \rightarrow \cos\alpha > 0 \quad \Big) \quad \Big) \wedge * \rightarrow \text{جواب}$$