سلیمر علایی

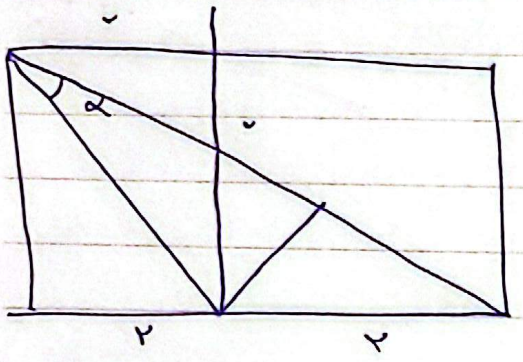
۱- $S = \frac{1}{2} \times 4 \times \sqrt{3} \times \sin\alpha = 4\sqrt{3}$

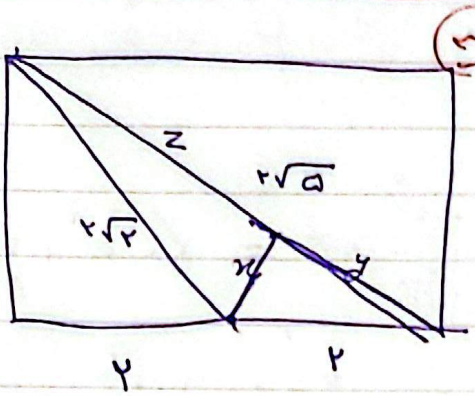
$\sin\alpha = \frac{\sqrt{3}}{2} \Rightarrow \alpha_1 = 60$

$\alpha_2 = 120$

$\frac{\alpha_2}{\alpha_1} = \frac{120}{60} = 2$

۲-





(۳)

$x^2 + (2\sqrt{5} - y)^2 = 7$

$x^2 + y^2 = 4$

$x^2 = 4 - y^2$

$7 = 4\sqrt{5}y - 20 + y^2 + 4 - y^2$

$7 = 4\sqrt{5}y - 16$

$4\sqrt{5}y = 23$

$y = \frac{\sqrt{5}}{4}$

$\left(\frac{\sqrt{5}}{4}\right)^2 + x^2 = 4$

$\frac{5}{16} + x^2 = 4$

$x^2 = \frac{59}{16}$ $\quad x = \frac{\sqrt{59}}{4}$ $\quad \left(\frac{\sqrt{5}}{2}\right)$

$7 = z^2 + \left(\frac{\sqrt{5}}{2}\right)^2$

$\frac{5}{4} + z^2 = 7$

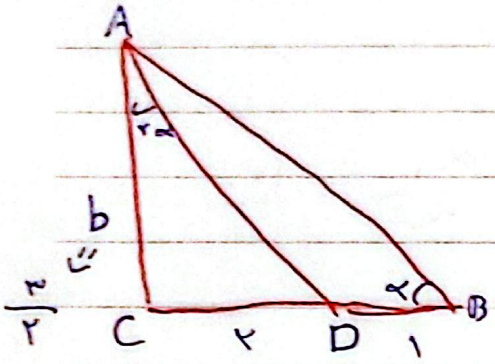
$z^2 = \frac{23}{4}$

$z = \frac{\sqrt{23}}{2}$

$\cot\alpha = \frac{z}{x} = \frac{\frac{\sqrt{23}}{2}}{\frac{\sqrt{5}}{4}} = (۳)$

۱۱

۳-



$$\cot\alpha = \frac{3a}{b} = \frac{3}{b}$$

$$\tan(2\alpha) = \frac{2}{b} = \frac{2\tan\alpha}{1-\tan^2\alpha} = \frac{2\times\frac{b}{3}}{1-\frac{b^2}{9}}$$

$$\frac{9-b^2}{9}\times 2 = 2\times b^2 \times \frac{1}{3}$$

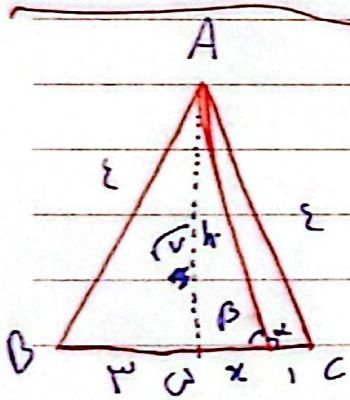
$$b^2 = \frac{9-b^2}{3} \Rightarrow 3b^2 = 9-b^2$$

$$4b^2 = 9$$

$$b^2 = \frac{9}{4} \quad b = \frac{3}{2}$$

$$\cot\alpha = \frac{a}{b} = \frac{3}{\frac{3}{2}} = 2 \Rightarrow (2)$$

۴- $\frac{\sqrt{7}}{2}$



$$\alpha+\beta = 180^\circ$$

$$|\tan\alpha| = |\tan\beta|$$

$$\frac{3+1}{2} = 2 \quad 3-1=2$$

$$\left.\begin{aligned}(3-x)^2 + h^2 &= 16\\ (1+x)^2 + h^2 &= 16\end{aligned}\right] \Rightarrow x = 2$$

$$h^2 = 16-9$$

$$h = \sqrt{7}$$

$$|\tan\beta| = |\tan\alpha| = \frac{\sqrt{7}}{2} \Rightarrow \frac{\sqrt{7}}{2}$$

$\sin^2 + \underbrace{\sin^2 + \cos^2}_{1} = \frac{4}{2}$ — ①

$\sin^2 = \frac{1}{2} \Rightarrow |\sin| = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$

$\sin^2 = \frac{1}{2}$ $\sin^2 + \cos^2 = 1 \Rightarrow \cos^2 = \frac{2}{2}$

$\tan^2 \alpha = \frac{\sin^2}{\cos^2} = \frac{\frac{1}{2}}{\frac{2}{2}}$ (1/2) $\cos = \sqrt{\frac{2}{2}}$

$\sin^4 \alpha = (\sin^2 \alpha)^2 = (1 - \cos^2)^2 = 1 + \cos^4 - 2\cos^2 \Rightarrow$ ②

$$\frac{\sin^4 \alpha + 4\cos^2 \alpha}{1 + \cos^2 \alpha} = \frac{1 + \cos^4 \alpha + 2\cos^2 \alpha}{1 + \cos^2 \alpha} = \frac{(1 + \cos^2 \alpha)^2}{1 + \cos^2 \alpha} = 1 + \cos^2 \alpha$$ (1)

$$\frac{\cos^4 \alpha + 4\sin^2 \alpha}{1 + \sin^2 \alpha} = \frac{1 + \sin^4 \alpha - 2\sin^2 \alpha + 4\sin^2 \alpha}{1 + \sin^2} = \frac{(1 + \sin^2)^2}{1 + \sin^2} =$$

$1 + \sin^2$ (2)

(1) - (2) $= 1 + \cos^2 - 1 - \sin^2 = \cos^2 - \sin^2 = \cos(2\alpha)$

$\cos(2\alpha)$

$\sin\left(\frac{9\pi}{2}\right) = \left(\frac{\pi}{2}\right)$

$\left(\frac{5\pi}{2}\right) : \frac{3\pi}{2}$

$\sin(\alpha + \frac{\pi}{2}) = <0$

$(\sin\alpha\cos\frac{\pi}{2} + \cos\alpha\sin\frac{\pi}{2}) \Rightarrow$ (1)

$\cos\left(\frac{3\pi}{2} - \alpha\right) =$

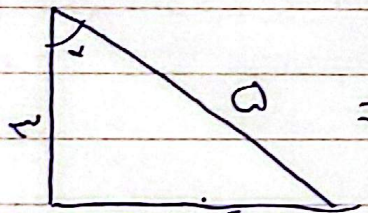
$\sin(\alpha + \frac{\pi}{2}) = \cos(\alpha)$

$\cos\left(\frac{5\pi}{2} - \alpha\right) = -\sin\alpha$

$\tan\left(\alpha - \frac{3\pi}{2}\right) = -\cot(\alpha) \Rightarrow$

$-\cot\alpha$

$\cos(\alpha) - \sin(\alpha) + \cot(\alpha) = -\sin\cos\theta + \cot\alpha)$



$\Rightarrow \sin = -\frac{\varepsilon}{\Omega}$

$\Rightarrow \cos = -\frac{3}{\Omega}$

$-\sin\cos\theta =$

$-\sin\cos\theta + \cot\alpha = \frac{-12}{25} + \frac{3}{\varepsilon} = \frac{27}{100}$

۱ ۱ $x_0 \frac{\pi}{۱۲}$

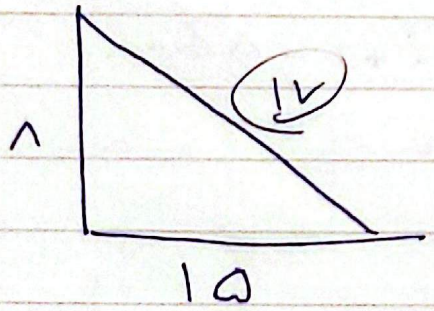
$$۳\cos\frac{۷\pi}{۱۲} + \sqrt{۲}\left(\sin\frac{\pi}{۱۲} - \cos\frac{\pi}{۱۲}\right)$$

$$۳\times\frac{۱}{۲} + \sqrt{۲}\times\sqrt{۲}\left(\sin\left(\frac{\pi}{۱۲} - \frac{\pi}{۴}\right)\right) =$$

$$\frac{۳}{۲} + ۲\times\sin\left(-\frac{\pi}{۶}\right) = \frac{۳}{۲} + (۲\times -\frac{۱}{۲}) = \frac{۳}{۲} - \frac{۲}{۲} = \frac{۱}{۲}$$

۹-

$$\tan(۲\alpha) = \frac{۲\tan\alpha}{۱-\tan^۲\alpha} \Rightarrow \tan\alpha = \frac{\frac{۱}{۳}}{\frac{۱۰}{۲۴}} = \frac{۸}{۱۵} \Rightarrow$$



$$\sin\alpha = \frac{۸}{۱۷}$$

$$\cos\alpha = \frac{۱۵}{۱۷}$$

$$\Rightarrow$$

$$\frac{\tan\alpha - \sin\alpha}{\sin\alpha - \cos\alpha} = \frac{\frac{۸}{۱۵} - \frac{۸}{۱۷}}{\frac{۸}{۱۷} - \frac{۱۵}{۱۷}} = \frac{\frac{۱۴}{۱۲۰}}{\frac{-۷}{۱۷}} = -\frac{۱۴}{۱۰۵}$$

۶۴+۲۲۵ = ۲۸۹

۱۵- $0 < \frac{\cot\alpha}{\sin\alpha} \Rightarrow 0 < \frac{\cos\alpha}{\sin^2\alpha} \Rightarrow \cos\alpha > 0$

$\sin^2\alpha$ همواره مثبت

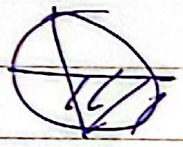
ناحیه اول

$2\sin\alpha < 2\sin\alpha\cos\alpha$

بین ۰ و ۱ پس

چرا $\sin\alpha < 0$ اگر مثبت بود بعد از ضرب شدن در یک عدد بین ۰ و ۱ کوچکتر می‌شود پس $2\sin\alpha < 0$ است

$\left.\begin{array}{l}\sin\alpha < 0 \\ \cos\alpha > 0\end{array}\right\} \Rightarrow$



ناحیه چهارم