$\sin\alpha<0 \quad \cos\alpha<0 \qquad +\tan(\frac{\pi}{2}-\alpha)$ ۷)

۰/۵

$\sin(\frac{\pi}{2}+\alpha)\cos(\frac{\pi}{2}-\alpha)-\cancel{\tan(\alpha-\frac{3\pi}{2})}$

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

$\frac{\cos\alpha((1-\cos^2\alpha)+1)}{\sin\alpha}=\frac{\cos\alpha(\cos^2\alpha)}{\sin\alpha}=\frac{\cos^3\alpha}{\sin\alpha} \qquad \tan\alpha=\frac{۴}{۳}=\frac{\sin\alpha}{\cos\alpha}$

$\to \frac{(۳)^۳}{۴}=\frac{-۲۷}{-۴}$ (۶/۷۵)

$(۲\cos\frac{\pi}{۳}+\sqrt{۲}\sin\frac{\pi}{۱۲}-\sqrt{۲}\cos\frac{\pi}{۱۲})$ ۸)

$(۲\cos ۶۰^\circ+\sqrt{۲}\sin ۱۵^\circ-\sqrt{۲}\cos ۱۵^\circ)$

۰/۵

$\frac{۳}{۲}+\sqrt{۲}(\sin(\frac{\pi}{۳}-\frac{\pi}{۴})-\cos(\frac{\pi}{۳}-\frac{\pi}{۴})) \to \frac{۳}{۲}+\sqrt{۲}(\frac{\sqrt{۳}-\sqrt{۲}}{۲})-(\frac{۱-\sqrt{۲}}{۲})$

$\frac{۳}{۲}+\sqrt{۲}(\frac{\sqrt{۳}-\sqrt{۶}-۱+\sqrt{۲}}{۲})=\frac{۳+\sqrt{۶}-\sqrt{۲}}{۲}$

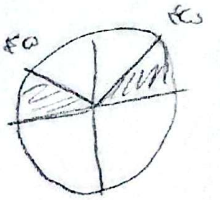
$\boxed{\tan(\frac{\alpha}{۲})=\frac{۱}{۴}} \qquad \tan\frac{\alpha}{۲}=\frac{\sin\alpha}{۱+\cos\alpha}=\frac{۱-\cos\alpha}{\sin\alpha} \to ۴-۴\cos\alpha=\frac{۱+\cos\alpha}{۴}$ ۹)

$\Rightarrow \cos\alpha=\frac{۱۵}{۱۷} \qquad \sin=\frac{۸}{۱۷}$

$\tan=\frac{۸}{۱۵}$

۲

$\frac{\frac{۸}{۱۵}-\frac{۸}{۱۷}}{\frac{۸}{۱۷}-\frac{۱۵}{۱۷}}=\frac{\frac{۱۶}{\cancel{۱۷}\times۱۵}}{\frac{-۷}{\cancel{۱۷}}}=\frac{\frac{۱۶}{۱۵}}{\frac{-۷}{۱}}=\boxed{-\frac{۱۶}{۱۰۵}}$

$۲\sin\alpha<\sin ۲\alpha \Rightarrow \alpha=$  ربع اول و دوم $\Rightarrow 0<\alpha\le ۴۵ \cup ۱۳۵\le\alpha<۱۸۰$ ۱۰)

$0<\frac{\cot\alpha}{\sin\alpha} \Rightarrow \frac{\frac{\cos\alpha}{\sin\alpha}}{\frac{\sin\alpha}{۱}}=0<\frac{\cos\alpha}{\sin^2\alpha} \Rightarrow \cos\alpha>0 \Rightarrow$ ربع اول و چهارم

۱

$\longrightarrow$ ربع اول $\to 0<\alpha\le ۴۵$

$\frac{\cot\alpha}{\sin\alpha}>0 \to \frac{\cos}{\sin^2\alpha}>0 \qquad \sin^2\alpha>0 \to \cos\alpha>0$

$۲\sin\alpha<\sin ۲\alpha \to ۲\sin\alpha<۲\sin\alpha\cos\alpha \to \qquad \sin\alpha(\cos\alpha-\sin\alpha)>0 \to \sin\alpha<0$

$\to$ ناممکن

آیناز رهنمت

۱۴

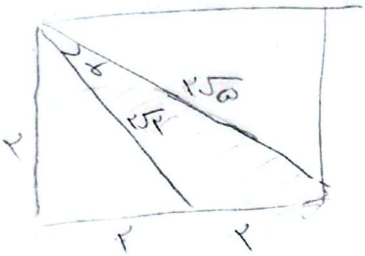
۱) ۴

$$\frac{۱}{۲}\times ۶\times ۲\sqrt{۳}\times \sin\alpha = ۶/۵ - \sin\alpha=\frac{\sqrt{۳}}{۲}$$

$$\sin\alpha=\frac{\sqrt{۳}}{۲}\begin{cases}\alpha=\frac{\pi}{۳}\\ \alpha=\frac{۲\pi}{۳}\end{cases}$$

$$\frac{\alpha max}{\alpha min}=\frac{\frac{۲\pi}{۳}}{\frac{\pi}{۳}}=۲$$

۲) ۴



$$S=۴-۲=۲=۲\sqrt{۵}\times ۲\sqrt{۲}\times\frac{۱}{۲}\times\sin\alpha \Rightarrow$$

$$۲\sqrt{۱۰}\sin\alpha=۲ \quad \sin\alpha=\frac{۲}{۲\sqrt{۱۰}}=\frac{۱}{\sqrt{۱۰}}=\boxed{\frac{\sqrt{۱۰}}{۱۰}}$$

$$\cot\alpha=\frac{\cos\alpha}{\sin\alpha}=\frac{\frac{\sqrt{۹۰}}{۱۰}}{\frac{\sqrt{۱۰}}{۱۰}}=\frac{\sqrt{۹۰}}{\sqrt{۱۰}} \Rightarrow \cos\alpha=\frac{\sqrt{۹۰}}{۱۰}$$

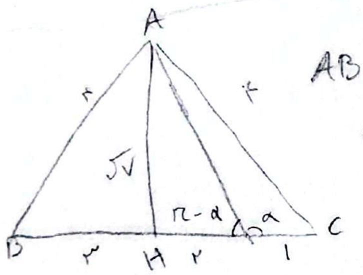
$$\rightarrow \frac{۳\sqrt{۱۰}}{\sqrt{۱۰}}=۳$$

۳) ۵

$$۳)\ \tan B=\frac{AD}{AB}\rightarrow \tan ۲\alpha=\frac{۲}{x} \qquad \tan C=\frac{AB}{AC}\rightarrow \tan\alpha=\frac{x}{۳}$$

$$\rightarrow \tan ۲\alpha \rightarrow \frac{۲}{x}=\frac{۲\times\frac{x}{۳}}{۱-\frac{x^۲}{۹}} \rightarrow x=\frac{۳}{۲} \qquad \tan\alpha=\frac{۱}{۲},\ \cot\alpha=۲$$

۴) ۴



$$AB^۲=AH^۲+BH^۲=۱۶=AH^۲+۹$$

$$\Rightarrow AH=\sqrt{۷}$$

$$\tan(\pi-\alpha)=\frac{\sqrt{۷}}{۲}\rightarrow -\tan\alpha=\frac{\sqrt{۷}}{۲}\rightarrow \tan\alpha=-\frac{\sqrt{۷}}{۲}$$

۵) ۴

$$\sin^۲x+\underbrace{\sin^۲x+\cos^۲x}_{۱}=\frac{۴}{۳} \Rightarrow \sin^۲x=\frac{۱}{۳}\rightarrow \sin x=\frac{۱}{\sqrt{۳}} \Rightarrow \cos x=\frac{\sqrt{۲}}{\sqrt{۳}}$$

$$\tan^۲x=\left(\frac{\frac{۱}{\sqrt{۳}}}{\frac{\sqrt{۲}}{\sqrt{۳}}}\right)^۲=\left(\frac{۱}{\sqrt{۲}}\right)^۲=\frac{۱}{۲}$$

۶) ۱

$$\frac{\sin^۴\alpha+۴(۱-\sin^۲\alpha)}{۱+(۱-\sin^۲\alpha)}-\frac{\cos^۴\alpha+۴(۱-\cos^۲\alpha)}{۱+(۱-\cos^۲\alpha)}=\frac{\sin^۴\alpha+۴-۴\sin^۲\alpha}{۲-\sin^۲\alpha}-\frac{\cos^۴\alpha+۴-۴\cos^۲\alpha}{۲-\cos^۲\alpha}$$

$$\frac{(\sin^۲\alpha-۲)^۲}{(۲-\sin^۲\alpha)}-\frac{(۲-\cos^۲\alpha)^۲}{۲-\cos^۲\alpha}=\sin^۲\alpha-۲-۲+\cos^۲\alpha=۱-۴=-۳$$

۶) $\dfrac{\sin^۴\alpha + ۴(۱-\sin^۲\alpha)}{۱+(۱-\sin^۲\alpha)} - \dfrac{\cos^۴\alpha + ۴(۱-\cos^۲\alpha)}{۱+(۱-\cos^۲\alpha)}$

$= \dfrac{(۲-\sin^۲\alpha)^۲}{۲-\sin^۲\alpha} - \dfrac{(۲-\cos^۲\alpha)^۲}{۲-\cos^۲\alpha} = ۲-\sin^۲\alpha-۲+\cos^۲\alpha$

$= \cos ۲\alpha$

۷) $\sin\left(\dfrac{۹\pi}{۲}+\alpha\right) = \cos\alpha$ $\quad\cos\left(\dfrac{۷\pi}{۲}-\alpha\right) = -\sin\alpha$

$\tan\left(\alpha-\dfrac{۳\pi}{۲}\right) = -\cot\alpha$ $\quad\rightarrow \dfrac{-۳}{۵}\times\dfrac{۴}{۵}+\dfrac{۳}{۴} = \dfrac{۲۷}{۱۰۰}$

۸) $\dfrac{۳}{۲} + \sqrt{۲}\Big(\underbrace{\sin\dfrac{\pi}{۱۲}+\cos\dfrac{\pi}{۱۲}}_{A}\Big)$ $\quad A^۲ = ۱-\sin\dfrac{\pi}{۶} = ۱-\dfrac{۱}{۲} = \dfrac{۱}{۲} \xrightarrow[A<۰]{\sqrt{\ }} A = \dfrac{-۱}{\sqrt{۲}}$

$\dfrac{۳}{۲} + \sqrt{۲}\times\dfrac{-۱}{\sqrt{۲}} = \dfrac{۱}{۲}$