Subject:
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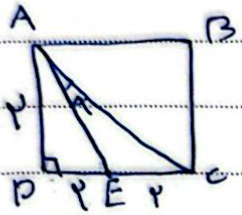
۲۰ ریاضی ۲

۱) $S=\frac{1}{2}ab\sin\alpha \rightarrow 6\sqrt{3}=\frac{1}{2}\times\sqrt{3}\times 6\times\sin\alpha$

$\sin\alpha=\frac{\sqrt{3}}{2}$ $\begin{cases}\alpha=60^\circ & \frac{120^\circ}{60^\circ}=2\\ \alpha=120^\circ\end{cases}$ ۵

۲)



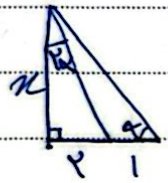
$AE^2=8 \quad AE=2\sqrt{2} \quad AC=2\sqrt{10}$

$EC^2=AC^2+AE^2-2AC.AE\cos\alpha$ ۵

$4=8+40-8\sqrt{10}\cos\alpha$

$\Rightarrow\cos\alpha=\frac{3}{\sqrt{10}} \Rightarrow \sin\alpha=\frac{1}{\sqrt{10}} \Rightarrow \cot\alpha=3$

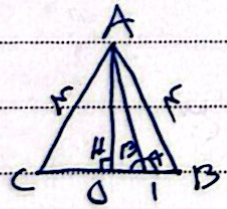
۳) $\cot\alpha=\frac{3}{x} \quad \cot 2\alpha=\frac{x}{2}$



$\cot 2\alpha=\frac{\cot^2\alpha-1}{2\cot\alpha} \Rightarrow \frac{x}{2}=\frac{\frac{9-x^2}{x^2}}{\frac{6}{x}} \Rightarrow x=\frac{3}{2}$ ۵

$\cot\alpha=\frac{3}{\frac{3}{2}}=2$

۴)



$AH=\sqrt{16-9}=\sqrt{7}$

$\tan(\pi-\alpha)=-\tan\alpha=\frac{\sqrt{7}}{3} \Rightarrow \tan\alpha=-\frac{\sqrt{7}}{3}$ ۵

۵) $2\sin^2x-\cos^2x=\sin^2x+1=\frac{4}{3} \Rightarrow \sin^2x=\frac{1}{3}, \cos^2x=\frac{2}{3}$ ۵

$\tan 2x+1=\frac{1}{\cos^2x} \Rightarrow \tan 2x=\frac{3}{2}-1=\frac{1}{2}$ ۵

۶) $\frac{\cos^4\alpha-2\cos^2\alpha+1}{1+\cos^2\alpha}=\frac{\sin^4\alpha-2\sin^2\alpha+1}{1+\sin^2\alpha}=\frac{(1-\cos^2\alpha)^2}{1+\cos^2\alpha}$ ۶

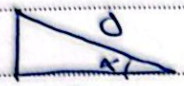
$1+\cos^2\alpha-\sin^2\alpha-1=\cos^2\alpha$ ۵

$\rightarrow \frac{(\sin^2\alpha-1)^2}{1+\sin^2\alpha}$

Arman

۷- $\sin(\frac{9\pi}{2}+\alpha)\cos(\frac{7\pi}{2}+\alpha)+\tan(\frac{7\pi}{2}-\alpha)$

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



$\sin\alpha=-\frac{۴}{۵}$

$\cos\alpha=-\frac{۳}{۵}$

$=\frac{۳}{۵}+\frac{۴}{۵}+\frac{۳}{۴}=۰,۲۷$ ✓

۸- $\sin\alpha-\cos\alpha=\sqrt{۲}\sin(\alpha-\frac{\pi}{۴})$

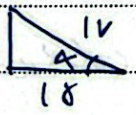
✓

۹- $۲\cos^{۲}x+\sqrt{۲}\sin x-\sqrt{۲}\cos x=۳\cos^{۲}x+\sqrt{۲}(\sin x-\cos x)$

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

$\sqrt{۲}\sin(x-\frac{\pi}{۴})=۲\sin(-۳۰)$

۱۰- $\tan\alpha=\frac{۲\tan\frac{\alpha}{۲}}{۱-\tan^{۲}\frac{\alpha}{۲}}=\frac{۲\times\frac{۱}{۴}}{۱-\frac{۱}{۱۶}}=\frac{۸}{۱۵}$



$\frac{\tan\alpha-\sin\alpha}{\sin\alpha-\cos\alpha}=\frac{\frac{۸}{۱۵}-\frac{۸}{۱۷}}{\frac{۸}{۱۷}-\frac{۱۵}{۱۷}}=\frac{-۱۶}{-۱۵}$

✓

۱۱- $\frac{\cot\alpha}{\sin\alpha}>۰\Rightarrow\frac{\cos\alpha}{\sin^{۲}\alpha}>۰\Rightarrow\cos\alpha>۰$ ربع اول

۱۲- $۲\sin\alpha<\sin۲\alpha\rightarrow ۲\sin\alpha<۲\sin\alpha\cos\alpha$

$\Rightarrow\sin\alpha\cos\alpha-\sin\alpha>۰\rightarrow\sin\alpha(\cos\alpha-۱)>۰$

$\Rightarrow\sin\alpha<۰\rightarrow$ ربع چهارم

✓

$\Rightarrow$ ربع چهارم

Arman