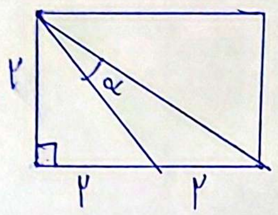
کلاس A　　　　تکلیف ۲۷　　　　- آرمین ایزدی -

-۱

$S=\frac{1}{۲}AB\times AC\times \sin\alpha \longrightarrow ۴،۵=\frac{1}{۲}\times\sqrt{۳}\times ۶\times\sin\alpha \longrightarrow \sin\alpha=\frac{\sqrt{۳}}{۲} \longrightarrow \frac{Max(\alpha)}{Min(\alpha)}=\frac{\frac{۲\pi}{۳}}{\frac{\pi}{۳}}=\boxed{۲}$

-۲

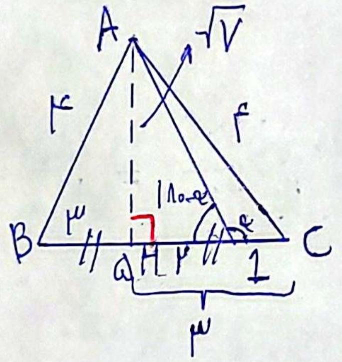


$\tan(\alpha+۴۵)=\frac{1+\tan\alpha}{1-\tan\alpha}=\frac{۴}{۲}\longrightarrow ۲+۲\tan\alpha=۴-۴\tan\alpha$

$\Longrightarrow \tan\alpha=\frac{1}{۳}\longrightarrow \boxed{\cot\alpha=۳}$

-۳

-۴



$AH=\sqrt{۴^۲-۳^۲}=\sqrt{۷}\Longrightarrow \tan(۱۸۰-\alpha)=-\tan\alpha=\frac{\sqrt{۷}}{۲}$

$\Longrightarrow \boxed{\tan\alpha=-\frac{\sqrt{۷}}{۲}}$

-۵

$۲\sin^۲x+\cos^۲x=\frac{۴}{۳}\xrightarrow{\div\cos^۲x}۲\tan^۲x+1=\frac{۴}{۳}\times\frac{1}{\cos^۲x}\longrightarrow ۲\tan^۲x+1=\frac{۴}{۳}(1+\tan^۲x)\Longrightarrow \frac{۲}{۳}\tan^۲x=\frac{1}{۳}$

$\longrightarrow \tan^۲x=\frac{1}{۲}$

-۶

$\frac{\sin^۴\alpha+۴\cos^۲\alpha}{1+\cos^۲\alpha}-\frac{\cos^۴\alpha+۴\sin^۲\alpha}{1+\sin^۲\alpha}=\frac{\sin^۴\alpha+۴(1-\sin^۲\alpha)}{1+(1-\sin^۲\alpha)}-\frac{\cos^۴\alpha+۴(1-\cos^۲\alpha)}{1+(1-\cos^۲\alpha)}=\frac{\sin^۴\alpha-۴\sin^۲\alpha+۴}{۲-\sin^۲\alpha}$ ادامه پایین

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

CamScanner

-۷

$\tan\alpha = \frac{4}{3}$ $\qquad -\tan(\frac{3\pi}{2}-\alpha) = -\cot\alpha$

$\sin(\frac{9\pi}{2}+\alpha)\cos(\frac{7\pi}{2}-\alpha) - \tan(\alpha - \frac{3\pi}{2}) = \cos\alpha \times -\sin\alpha - (-\cot\alpha)$

$\cos^2\alpha = \frac{1}{1+\tan^2\alpha} = \frac{1}{1+\frac{16}{9}} = \frac{9}{25} \longrightarrow \cos\alpha = -\frac{3}{5}$ ، $\sin\alpha = \tan\alpha \times \cos\alpha = \frac{4}{3} \times -\frac{3}{5} = -\frac{4}{5}$

$\cot\alpha = \frac{1}{\tan\alpha} = \frac{3}{4}$

$\Longrightarrow \cos\alpha \times -\sin\alpha + \cot\alpha = (-\frac{3}{5})(\frac{4}{5}) + \frac{3}{4} = \boxed{0.27}$

-۸

$x = \frac{\pi}{12}$

$3\cos 4x + \sqrt{2}\sin x - \sqrt{2}\cos x = 3\cos(4\times\frac{\pi}{12}) + \sqrt{2}(\sin x - \cos x) = 3\cos\frac{\pi}{3} + \sqrt{2} \times -\sqrt{(1-\sin 2x)}$

$= \frac{3}{2} + \sqrt{2} \times -\sqrt{(1-\sin\frac{\pi}{6})} = \frac{3}{2} + \sqrt{2} \times -\sqrt{\frac{1}{2}} = \frac{3}{2} - 1 = \boxed{\frac{1}{2}}$

-۹

$\sin\alpha = \frac{2\tan\frac{\alpha}{2}}{1+\tan^2\frac{\alpha}{2}} = \frac{2\times\frac{1}{4}}{1+(\frac{1}{4})^2} = \frac{8}{17}$ ، $\cos\alpha = \frac{1-\tan^2\frac{\alpha}{2}}{1+\tan^2\frac{\alpha}{2}} = \frac{1-(\frac{1}{4})^2}{1+(\frac{1}{4})^2} = \frac{15}{17}$

$\frac{\tan\alpha - \sin\alpha}{\sin\alpha - \cos\alpha} = \frac{\sin\alpha - \sin\alpha\cos\alpha}{\sin\alpha\cos\alpha - \cos^2\alpha} = \frac{\frac{8}{17} - \frac{8}{17}\times\frac{15}{17}}{\frac{8}{17}\times\frac{15}{17} - (\frac{15}{17})^2} = \frac{8\times17 - 8\times15}{8\times15 - 15\times15} = \frac{8\times2}{-7\times15} = \boxed{-\frac{16}{105}}$

-۱۰

$\frac{\cot\alpha}{\sin\alpha} > 0 \rightarrow \frac{\frac{\cos\alpha}{\sin\alpha}}{\sin\alpha} = \frac{\cos\alpha}{\sin^2\alpha} > 0 \xrightarrow{\sin^2\alpha>0} \cos\alpha > 0$

$-\sin 2\alpha > 2\sin\alpha \longrightarrow 2\cancel{\sin}\alpha\cos\alpha > 2\cancel{\sin}\alpha$

چون توانستیم ۲sinα را از ۲ طرف بزنیم پس هر۲ مثبت اند

$\sin\alpha > 0$
$\cos\alpha > 0 \longrightarrow$ $\boxed{\text{ناحیه اول}}$