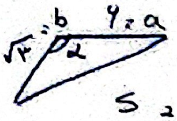
الیا علی نجاری   یازدهم دختر B   تکلیف ۲۷

۲۵

۱-

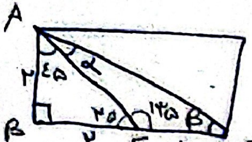


$S = ۴,۵$ $\frac{\max\alpha}{\min\alpha} = ?$

$S = \frac{۱}{۲} a \times b \times \sin\alpha = ۴,۵ = \frac{۱}{\cancel{۲}} \overset{۳}{\cancel{۶}} \times \sqrt{۳} \times \sin\alpha \Longrightarrow \sin\alpha = \frac{\cancel{۳} \times ۱,۵}{\cancel{۳} \times \sqrt{۳}} = \frac{۳}{۲\sqrt{۳}} = \frac{\sqrt{۳}}{۲}$

$\Rightarrow \alpha = ۱۲۰^\circ$ یا $۶۰^\circ \longrightarrow \frac{\max\alpha}{\min\alpha} = \frac{۱۲۰}{۶۰} = \boxed{۲}$

۲-



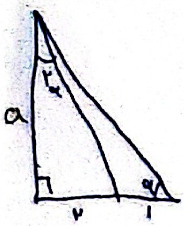
$\cot\alpha ?$

$\tan\beta = \frac{۱}{۲}$

در $A\hat{E}C \rightarrow \beta + \alpha = ۴۵^\circ \rightarrow \alpha = ۴۵ - \beta \Longrightarrow \cot(\alpha) = \frac{۱}{\tan\alpha} = \frac{۱}{\tan(۴۵ - \beta)}$

$= \frac{۱ + \tan ۴۵ \tan\beta}{\tan ۴۵ + \tan\beta} = \frac{۱ + \frac{۱}{۲}}{۱ - \frac{۱}{۲}} = \frac{\frac{۳}{۲}}{\frac{۱}{۲}} = \boxed{۳}$

۳-



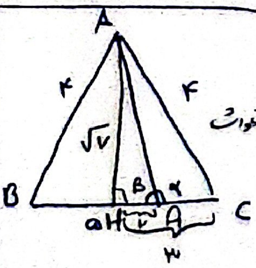
$\cot(۲\alpha) = \frac{a}{۳} \Longrightarrow \cot(۲\alpha) = \frac{۱ - \tan^2\alpha}{۲\tan\alpha} = \frac{۱ - \frac{a^2}{۹}}{\frac{۲a}{۳}} = \frac{\frac{۹ - a^2}{\cancel{۹}\,۳}}{\frac{۲a}{\cancel{۳}}} = \frac{۹ - a^2}{۶a}$

$\cot(\alpha) = \frac{۳}{a} \rightarrow \tan\alpha = \frac{a}{۳}$

$\Longrightarrow \frac{a}{\cancel{۳}} = \frac{۹ - a^2}{{}_{۳}\cancel{۶}\,a} \longrightarrow ۳a^2 = ۹ - a^2 \rightarrow ۴a^2 = ۹ \rightarrow a = \pm\frac{۳}{۲}$ (غ ق ق)

$\cot\alpha = \frac{۳}{\frac{۳}{۲}} = \boxed{۲}$

۴-



$\tan\alpha ?$

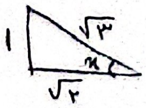
فیثاغورث: $AH^2 = AC^2 - HC^2 = ۱۶ - ۹ = ۷ \longrightarrow AH = \sqrt{۷}$

$\alpha = ۱۸۰ - \beta \Longrightarrow \tan\alpha = \tan(۱۸۰ - \beta) = -\tan\beta = -\frac{AH}{HD} = \boxed{-\frac{\sqrt{۷}}{۲}}$

۵-

$۲\sin^2 x + \cos^2 x = \frac{۴}{۳}$ $\tan^2 = ?$

$\sin^2 x + \underbrace{\sin^2 x + \cos^2 x}_{۱} = \frac{۴}{۳} \Longrightarrow \sin^2 x = \frac{۱}{۳} \rightarrow \sin x = \pm\frac{۱}{\sqrt{۳}}$



$\rightarrow \tan x = \pm\frac{۱}{\sqrt{۲}} \rightarrow \boxed{\tan^2 x = \frac{۱}{۲}}$

$\frac{\sin^4\alpha + ۴\cos^2\alpha}{۱ + \cos^2\alpha} - \frac{\cos^4\alpha + ۴\sin^2\alpha}{۱ + \sin^2\alpha} = \frac{\sin^4\alpha + ۴\cos^2\alpha + \sin^6\alpha + \cancel{۴\cos^2\alpha\sin^2\alpha} - \cos^4\alpha - ۴\sin^2\alpha - \cos^6\alpha - \cancel{۴\sin^2\cos^2}}{۱ + \underbrace{\sin^2\alpha + \cos^2\alpha}_{۱} + \sin^2\alpha\cos^2\alpha}$

$(\underbrace{\sin^4\alpha - \cos^4\alpha}_{(\sin^2\alpha - \cos^2\alpha)(\underbrace{\sin^2\alpha + \cos^2\alpha}_{۱})} + \underbrace{\sin^6\alpha - \cos^6\alpha}_{(\sin^2\alpha - \cos^2\alpha)(\sin^4\alpha + \cos^4\alpha + \sin^2\alpha\cos^2\alpha)} + ۴\cos^2\alpha - ۴\sin^2\alpha) \div (۲ + \sin^2\alpha\cos^2\alpha)$

$\underbrace{\sin^2\alpha + \cos^2\alpha}_{۱})^2 - ۲\sin\alpha\cos\alpha$

$۳\cos^2\alpha - ۳\sin^2\alpha = ۳(\cos^2\alpha - \sin^2\alpha)$

$= \overbrace{\sin^2\alpha - \cos^2\alpha + ۴\cos^2\alpha - ۴\sin^2\alpha} + (\cos^2\alpha - \sin^2\alpha)(\sin\alpha\cos\alpha - ۱) \div (۲ + \sin^2\alpha\cos^2\alpha)$

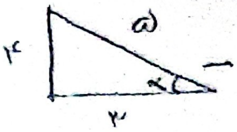
$= (\cos^2\alpha - \sin^2\alpha)(\cancel{\sin\alpha\cos\alpha + ۲}) \div (\cancel{\sin^2\alpha + \cos^2\alpha + ۲}) = \cos^2\alpha - \sin^2\alpha = \boxed{\cos(۲\alpha)}$

-۷

$\tan\alpha = \frac{۴}{۳}$

$\sin\left(\frac{۹\pi}{۲}+\alpha\right)\cos\left(\frac{۷\pi}{۲}-\alpha\right)-\tan\left(\alpha-\frac{۳\pi}{۲}\right)$

$=\sin\left(۴\pi+\frac{\pi}{۲}+\alpha\right)\cos\left(۲\pi+\frac{۳\pi}{۲}-\alpha\right)+\tan\left(\frac{۳\pi}{۲}-\alpha\right)$



$\rightarrow \sin\alpha = -\frac{۴}{۵}$

$\cos\alpha = -\frac{۳}{۵}$

$=-\cos(\alpha)\sin(\alpha)+\cot(\alpha) = \underbrace{-\left(-\frac{۳}{۵}\right)\left(-\frac{۴}{۵}\right)}_{-\frac{۱۲}{۲۵}}+\left(\frac{۳}{۴}\right) = \frac{-۴۸+۷۵}{۱۰۰} = \boxed{۰/۲۷}$ ۶

-۸

$x = \frac{\pi}{۱۲}$

$۳\cos۴x + \underbrace{\sqrt{۲}\sin x - \sqrt{۲}\cos x}_{\sqrt{۲}\underbrace{(\sin x - \cos x)}_{\sqrt{۴}\sin\left(x-\frac{\pi}{۴}\right)}} = ۳\cos۴x + ۲\sin\left(x-\frac{\pi}{۴}\right) \xrightarrow{x = \frac{\pi}{۱۲}} ۳\cos\left(\frac{\pi}{۳}\right) + ۲\sin\left(\frac{\pi}{۱۲}-\frac{۳\pi}{۱۲}\right)$

$= ۳\cos\left(\frac{\pi}{۳}\right) - ۲\sin\left(\frac{\pi}{۹}\right)$ ۶

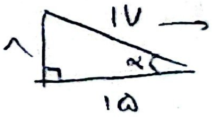
$= ۳ \times \frac{۱}{۲} - ۱ = \boxed{\frac{۱}{۲}}$

-۹

$\tan\left(\frac{\alpha}{۲}\right) = \frac{۱}{۴}$

$\frac{\tan\alpha - \sin\alpha}{\sin\alpha - \cos\alpha}$?

$\tan\alpha = \frac{۲\tan\left(\frac{\alpha}{۲}\right)}{۱-\tan^۲\left(\frac{\alpha}{۲}\right)} = \frac{۲\times\frac{۱}{۴}}{۱-\frac{۱}{۱۶}} = \frac{۱۶۰}{۳۰} = \frac{۸}{۱۵} \longrightarrow$



$۱۷ \rightarrow$ فیثاغورث $\sqrt{۱۵^۲+۸^۲}$

$\sin\alpha = \frac{۸}{۱۷}$

$\cos\alpha = \frac{۱۵}{۱۷}$

$\frac{\tan\alpha - \sin\alpha}{\sin\alpha - \cos\alpha} = \frac{\frac{۸}{۱۵}-\frac{۸}{۱۷}}{\frac{۸}{۱۷}-\frac{۱۵}{۱۷}} = \frac{\frac{۱۳۶-۱۲۰}{۲۵۵}}{\frac{۱۳۶-۲۵۵}{۲۸۹}} = \frac{\frac{۱۶}{۲۵۵}}{\frac{-۱۱۹}{۲۸۹}} = \boxed{\frac{-۱۶}{۱۰۵}}$ ۶

-۱۰

انتهای کمان α در کدام ربع ?

$۲\sin\alpha < \sin۲\alpha$

$۲\sin\alpha < ۲\sin\alpha\cos\alpha$

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

اگر $\sin\alpha > ۰$ ↓ $۱ < \cos\alpha$ ق غ

اگر $\sin\alpha < ۰$ ↓ $۱ > \cos\alpha$ ✓ ق ق $\rightarrow \boxed{\sin\alpha < ۰}$

$\frac{\cot\alpha}{\sin\alpha} > ۰$

↓

$\frac{\frac{\cos\alpha}{\sin\alpha}}{\sin\alpha} > ۰$

↓

$\frac{\cos\alpha}{\sin^۲\alpha} > ۰ \Longrightarrow \boxed{\cos\alpha > ۰}$

$\Longrightarrow$ ربع چهارم ۶