نام و نام خانوادگی: زهرا ... شماره تکلیف: ۲۷ نمره یازدهم B [redacted] یازدهم ریاضی

$\sqrt3 , 6 , \hat\alpha$ $S=4.5$ بیشترین مقدار $\alpha = 120°$ کمترین مقدار $\alpha = 60°$

$S_{مثلث} = \frac{\sqrt3\times6\times\sin\alpha}{2}=4.5 \to 3\sqrt3\times\sin\alpha=4.5 \to \sin\alpha=\frac{4.5}{3\sqrt3}=\frac{\sqrt3}{2}$ (۱

$\Rightarrow \alpha=60$ یا $\alpha=120$ $\frac{120}{60}=\boxed{2 \text{ برابر}}$

$AD^2+DP^2=AP^2 \to \sqrt{4+4}=2\sqrt2=AP$

$AC=\sqrt{4+16}=2\sqrt5$

① $S_{ADC}=2\times2\times\frac12=2$ (۲

② $S_{ADC}=\frac{2\sqrt2\times2\sqrt5\times\sin\alpha}{2}=2 \to 4\sqrt{10}\times\sin\alpha=4 \to \sin\alpha=\frac{1}{\sqrt{10}}$

$1+\cot^2=\frac{1}{\sin^2} \to \cot^2=10-1=9 \to \cot\alpha=+3$ ✓ -3 ✗

$\overset{\Delta}{ABC}=\tan2\alpha=\frac{2}{x}$

$A\hat{B}C=\tan\alpha=\frac{x}{3}$

$\Rightarrow \frac{\frac{2x}{3}}{\frac{9-x^2}{9}}=\frac2x \to \frac{6x}{9-x^2}=\frac2x \to 6x^2=18-2x^2 \to 8x^2=18$

$\to x^2=\frac{18}{8} \to x^2=\frac94 \to x=\frac32$ (۳

$\tan\alpha=\frac{x}{3}=\frac12 \to \boxed{\cot\alpha=2}$

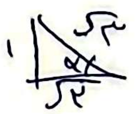
$\alpha+\beta=180 \to \tan\alpha=-\tan\beta \to \tan\alpha=\frac{-\sqrt7}{2}$

$BH=HC=3$, $HD=3-1=2$ $\to AD=\sqrt{7+4}=\sqrt{11} \to \tan B=\frac{\sqrt7}{2}$ (۴

$AH^2+BH^2=AB^2 \to AH^2=16-9=7 \to AH=\sqrt7$

$\tan=?$ $2\sin^2x+\cos^2x=\frac43 \to \sin^2x+\underbrace{\sin^2x+\cos^2x}_{1}=\frac43 \to \sin^2x=\frac13$

$\to \sin x=\pm\frac{1}{\sqrt3}$



$\to \tan x=\pm\frac{1}{\sqrt2} \to \boxed{\tan^2x=\frac12}$ (۵

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

$$\text{کسر اول} = (2-\sin^2 x) \;/\; \text{کسر دوم}: \frac{\cos^4 x + 4(1-\cos^2 x)}{1+1-\cos^2 x} = \frac{\cos^4 x + 4 - 4\cos^2 x}{2-\cos^2 x} = \frac{(\cos^2 x - 2)^2}{-(\cos^2 x - 2)}$$

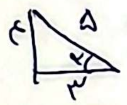
$$\left.\begin{array}{l}\text{کسر اول} = (2-\sin^2 x) \\ \text{کسر دوم} = (2-\cos^2 x)\end{array}\right\} \Rightarrow (2-\sin^2 x)-(2-\cos^2 x) = -\sin^2 x + \cos^2 x \rightarrow \frac{-1+\cos 2x + 1 + \cos 2x}{2}$$

$$\Rightarrow \frac{2\cos 2x}{2} = \boxed{\cos 2x}$$

$\tan\alpha = \frac{4}{3} \qquad \alpha \rightarrow$ ربع سوم

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

$$\longrightarrow -\cos\alpha \sin\alpha + \cot\alpha = -\frac{3}{5}\times\frac{4}{5} + \frac{3}{4} = \frac{-12}{25} + \frac{3}{4} = \boxed{\frac{-27}{100}}$$ ۷



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

$$= 3\cos\frac{\pi}{3} + \sqrt{2}(\sin x - \cos x) \xrightarrow{1} 3\times\frac{1}{2} + \sqrt{2}\left(\sqrt{2}\sin -\frac{\pi}{4}\right) = \frac{3}{2} + 2\left(-\frac{1}{2}\right) = \boxed{\frac{1}{2}}$$ ۸

① $\sin x - \cos x = \sqrt{2}\sin\left(\alpha - \frac{\pi}{4}\right)$

$\tan\left(\frac{\alpha}{2}\right) = \frac{1}{4}$

$$\frac{\tan\alpha - \sin\alpha}{\sin\alpha - \cos\alpha} = \frac{\dfrac{2\tan(\frac{\alpha}{2})}{1-\tan^2(\frac{\alpha}{2})} - \dfrac{2\tan(\frac{\alpha}{2})}{1+\tan^2(\frac{\alpha}{2})}}{\dfrac{2\tan(\frac{\alpha}{2})}{1+\tan^2(\frac{\alpha}{2})} - \dfrac{1-\tan^2(\frac{\alpha}{2})}{1+\tan^2(\frac{\alpha}{2})}} = \frac{\dfrac{2\times\frac{1}{4}}{1-\frac{1}{16}} - \dfrac{2\times\frac{1}{4}}{1+\frac{1}{16}}}{\dfrac{2\times\frac{1}{4}}{1+\frac{1}{16}} - \dfrac{1-\frac{1}{16}}{1+\frac{1}{16}}} =$$

$$= \frac{\dfrac{\frac{1}{2}}{\frac{15}{16}} - \dfrac{\frac{1}{2}}{\frac{17}{16}}}{\dfrac{\frac{1}{2}}{\frac{17}{16}} - \dfrac{\frac{15}{16}}{\frac{17}{16}}} = \frac{\frac{8}{15} - \frac{8}{17}}{\frac{8}{17} - \frac{15}{17}} = \frac{16\times 17}{255\times 7} = \boxed{\frac{-16}{105}}$$ ۹

$$2\sin\alpha < \sin 2\alpha \longrightarrow 2\sin\alpha < 2\sin\alpha\cos\alpha \longrightarrow 2\sin\alpha - 2\sin\alpha\cos\alpha < 0$$

$$\longrightarrow 2\sin\alpha\underbrace{(1-\cos\alpha)}_{\text{نامنفی}} < 0 \longrightarrow \sin\alpha < 0 \quad ②$$

$$\frac{\cot\alpha}{\sin\alpha} > 0 \longrightarrow \frac{\cos\alpha}{\sin^2\alpha} > 0 \longrightarrow \cos\alpha > 0 \quad ①$$ ۱۰

①, ② = $\boxed{\text{در ربع چهارم است}}$