به نام خدا

پویا ملکلیان

DATE / / SUBJECT:

① $T = \frac{\pi}{|-2|} = \frac{\pi}{2} \rightarrow \overline{AC} = \frac{\pi}{2}$, $x=0 \rightarrow \tan\frac{\pi}{4} = 1 \rightarrow B(0,1) \rightarrow$

$S_{ABC} = \frac{\pi}{2} \times \frac{1}{2} \times 1 = \frac{\pi}{4}$

② $\frac{4}{9} - (\sin\alpha)\times\frac{2}{3} - \frac{1}{4}(1-\sin^2\alpha) = 0 \xrightarrow{\times 36} 16 - 24\sin\alpha - 9 + 9\sin^2\alpha = 0 \rightarrow$

$9\sin^2\alpha - 24\sin\alpha + 7 = 0 \rightarrow$

- $\sin\alpha = \frac{7}{3}$ غق
- $\sin\alpha = \frac{1}{3} \rightarrow \sin^2\alpha = \frac{1}{9}, \cos^2\alpha = \frac{8}{9} \rightarrow \tan^2\alpha = \frac{1}{8}$

$\rightarrow 1+\tan^2\alpha = 1+\frac{1}{8} = \boxed{\frac{9}{8}}$

③ $0<\sin\alpha$, $\underbrace{0<-\cos\alpha}_{0>\cos\alpha} \rightarrow \log^{-\tan\alpha} = \log^{3} \rightarrow \tan\alpha = -3 \rightarrow$

$\cos^2\alpha = \frac{1}{10}, \sin^2\alpha = \frac{9}{10} \rightarrow \sin\alpha = \frac{3}{\sqrt{10}}, \cos\alpha = \frac{-1}{\sqrt{10}} \rightarrow \sin\alpha - \cos\alpha =$

$\frac{3}{\sqrt{10}} + \frac{1}{\sqrt{10}} = \boxed{\frac{4}{\sqrt{10}}}$

④ $\sin^4\theta + \cos^2\theta + \sin^2\theta = \frac{4}{5} + \sin^2\theta \rightarrow \sin^4\theta + \frac{1}{5} = \sin^2\theta \rightarrow$

$(1-\cos^2\theta)^2 + \frac{1}{5} = \sin^2\theta \rightarrow \cos^4\theta - 2\cos^2\theta + \frac{6}{5} = \sin^2\theta \rightarrow$

$\cos^4\theta + \sin^2\theta = 2(\cos^2\theta + \sin^2\theta) - \frac{6}{5} = 2 - \frac{6}{5} = \boxed{\frac{4}{5}}$

⑤ $\frac{\sin x(3+\cos x)}{2\sin^2 x} < 0 \longrightarrow \sin x < 0, \underbrace{\sin x}_{\ominus}\left(\frac{\overbrace{\sin x - 1}^{\ominus}}{\cos x}\right) > 0$

$\rightarrow \cos x > 0 \longrightarrow$ ناحیه چهارم

پویا فلطیان

DATE / / SUBJECT:

(۶) $\frac{2}{\sin x} = \frac{-3}{\cos x} \to \frac{4}{\sin^2 x} = \frac{9}{\cos^2 x} \to 4\cos^2 x = 9\sin^2 x \to 13\sin^2 x = 4 \to$

$\sin^2 x = \frac{4}{13}, \cos^2 x = \frac{9}{13} \to \tan^2 x = \frac{4}{9} \to$ طبق معادلهٔ اولیه $\sin x$ و $\cos x$ هم علامت نیستند. $\to \tan x = \frac{-2}{3}, \cot = \frac{-3}{2}$

$\to \tan x + \cot x = \frac{-2}{3} + \left(\frac{-3}{2}\right) = \boxed{\frac{-13}{6}}$

پویا فلفلیان

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(7)

$$\frac{\sqrt{1+\sin 50^\circ}}{\sin 50^\circ+\sin 10^\circ}=\frac{\sqrt{1+\cos 40^\circ}}{2\cos^2 40^\circ+\cos 40^\circ-1}=\frac{\sqrt{1+\cos 40^\circ}}{(2\cos 40^\circ-1)(\cos 40^\circ+1)}=\frac{1}{(\sqrt{1+\cos 40^\circ})(2\cos 40^\circ-1)}=\frac{1}{\sqrt{1+\sin 50^\circ}\,(2\sin 50^\circ-1)}$$

$$=\frac{1}{\sqrt{(1+\sin 50^\circ)(4\sin^2 50^\circ-4\sin 50^\circ+1)}}=\frac{1}{\sqrt{4\sin^2 50^\circ-4\sin 50^\circ+1+4\sin^3 50^\circ-4\sin^2 50^\circ+\sin 50^\circ}}=\frac{1}{\sqrt{4\sin^3 50^\circ-3\sin 50^\circ+1}}$$

$$=\frac{1}{\sqrt{-\sin 150^\circ+1}}=\frac{1}{\sqrt{1-\frac{1}{2}}}=\frac{1}{\frac{1}{\sqrt{2}}}=\boxed{\sqrt{2}}$$

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(8)

$$(\cos 10^\circ)(\cos 20^\circ)(\cos 40^\circ)\xrightarrow{\times \sin 10^\circ}\frac{1}{2}\sin 20^\circ\cos 20^\circ\cos 40^\circ=\frac{1}{4}\sin 40^\circ\cos 40^\circ$$

$$=\frac{1}{8}\sin 80^\circ=\frac{1}{8}\cos 10^\circ\times\frac{1}{\sin 10^\circ}=\boxed{\frac{1}{8}\cot 10^\circ}$$

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(9)

$$\sin\alpha=2-3\cos\alpha\longrightarrow\sin^2\alpha=9\cos^2\alpha+4-12\cos\alpha\longrightarrow$$

$$10\cos^2\alpha-12\cos\alpha+4=1\rightarrow 10\cos^2\alpha-12\cos\alpha=-3 \quad (1)$$

$$5\cos 2\alpha-12\cos\alpha=5(2\cos^2\alpha-1)-12\cos\alpha=10\cos^2\alpha-12\cos\alpha-5\xrightarrow{(1)}$$

$$10\cos^2\alpha-12\cos\alpha-5=-3-5=\boxed{-8}$$

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(10)

$$2\sin 72^\circ\times\sin(90+18-A)=1+\cos A\rightarrow 2\sin 72^\circ\times\cos(18-A)=1+\cos A$$

$$\rightarrow 2\cos 18^\circ\times(\cos A\cos 18+\sin A\sin 18)=1+\cos A\rightarrow 2\cos^2 18\cos A+\sin 36\sin A=1+\cos A$$

$$\rightarrow \cos A\times\cos 36+\sin 36\sin A=1\rightarrow\cos(A-36)=1\rightarrow\boxed{A=36^\circ}$$

$\cos 0$

Sahand