مبینا رضایی ۱

۱)

$B: x=0 \longrightarrow \tan\left(\frac{\pi}{4}\right)=1 \longrightarrow (0,1)$

$A: -2x+\frac{\pi}{4}=\frac{\pi}{2} \longrightarrow x=-\frac{\pi}{8}$

$C: -2x+\frac{\pi}{4}=\frac{-\pi}{2} \longrightarrow x=\frac{-3\pi}{8}$

$S=\frac{1}{2}\times 1\times\frac{\pi}{2}=\frac{\pi}{4}$

$C-A=\frac{\pi}{2}$

۲)

جایگذاری ریشه $\longrightarrow \frac{4}{9}-\frac{2}{3}(\sin\alpha)-\frac{1}{4}\cos^2\alpha=0 \xrightarrow{\times 36} 16-24\sin\alpha-9(1-\sin^2\alpha)=0$

$\longrightarrow 9\sin^2\alpha-24\sin\alpha+7=0 \longrightarrow \sin\alpha=\frac{24\pm\sqrt{576-252}}{18}$ $\begin{cases}\frac{1}{3} \checkmark \\ \frac{42}{18}\end{cases}$ غ ق ق

$\sin=\frac{1}{3} \longrightarrow \cos=\frac{\sqrt{8}}{3} \longrightarrow 1+\tan^2\alpha=\frac{1}{\cos^2\alpha}=\frac{1}{\frac{8}{9}}=\frac{9}{8}$

۳)

$\log^{\sin\alpha}-\log^{(-\cos\alpha)}=\log^{3} \longrightarrow \log^{\frac{\sin\alpha}{-\cos\alpha}}=\log^{3} \longrightarrow \sin\alpha=-3\cos\alpha$

براساس اینکه $-\cos\alpha$ در لگاریتم، باید مثبت باشد

توان ۲ $\longrightarrow \sin^2\alpha=9\cos^2\alpha \xrightarrow{\sin^2+\cos^2=1} 10\cos^2=1 \longrightarrow \cos^2=\frac{1}{10} \longrightarrow \cos=\boxed{-}\frac{\sqrt{10}}{10}$

$\longrightarrow \cos=-\frac{\sqrt{10}}{10}, \quad \sin=+\frac{3\sqrt{10}}{10} \qquad \sin\alpha-\cos\alpha=\frac{4\sqrt{10}}{10}$

۴)

$\sin^4\alpha+\cos^2\alpha=\frac{4}{5} \longrightarrow \sin^4\alpha-\sin^2\alpha+1=\frac{4}{5} \longrightarrow \sin^2\alpha(\underbrace{\sin^2\alpha-1}_{-\cos^2\alpha})+1=\frac{4}{5}$

$\longrightarrow -\sin^2\alpha\cos^2\alpha+1=\frac{4}{5}$

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

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۵)

$$\frac{\sin x\,(3+\cos x)}{2(1-\cos^2 x)} = \frac{\overset{\ominus}{\sin x}\,\overbrace{(3+\cos x)}^{\text{همواره مثبت}}}{\underbrace{2\sin^2 x}_{\text{همواره} +}} < 0 \longrightarrow \sin x < 0$$

$$\sin x \times \frac{\sin x}{\cos x} - \frac{1}{\cos x} = \frac{\sin^2 x - 1}{\cos x} = \frac{\overbrace{-\cos^2 x}^{\text{همواره} -}}{\cos x} > 0 \longrightarrow \sin x < 0$$

ناحیه ۳

۴)

$$\frac{2}{\sin x} + \frac{3}{\cos x} = 0 \longrightarrow \frac{2\cos x + 3\sin x}{\frac{1}{2}\sin 2x} = 0 \xrightarrow{\sin x \neq 0} 2\cos x + 3\sin x = 0$$

$$\longrightarrow \cos x = -\frac{3}{2}\sin x \longrightarrow \cos^2 x = \frac{9}{4}\sin^2 x \longrightarrow 1 - \sin^2 x = \frac{9}{4}\sin^2 x$$

مختلف العلامت اند

$$\longrightarrow \sin^2 x = \frac{4}{13} \longrightarrow \sin x = \pm\frac{2}{\sqrt{13}} \,,\; \cos x = \mp\frac{3}{\sqrt{13}}$$

$$\tan x + \cot x = \frac{1}{\sin x \cos x} = \frac{1}{-\frac{6}{13}} = -\frac{13}{6}$$

۷) صورت:

$$\sqrt{1+\sin 50} = \sqrt{1+\cos 40} \xrightarrow{\text{فرمول طلایی}} \sqrt{2\cos^2 20} = \sqrt{2}\cos 20$$

مخرج:

$$\sin 50 + \sin 10 = \sin(30+20) + \sin(30-20) =$$

$$\sin 30\cos 20 + \cos 30 \sin 20 + \sin 30\cos 20 - \cos 30\sin 20 = 2\underbrace{\sin 30}_{\frac{1}{2}}\cos 20$$

$$= \cos 20 \qquad \frac{\sqrt{1+\sin 50}}{\sin 50 + \sin 10} = \frac{\sqrt{2}\cos 20}{\cos 20} = \sqrt{2}$$

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$\frac{1}{2}\sin 20 \quad \frac{1}{4}\sin 40 \quad \frac{1}{8}\sin 80$

$\dfrac{\sin 10 \times \cos 10 \times \cos 20 \times \cos 40}{\sin 10} =$

$1 - 2\sin^2 5 \xrightarrow{\text{فرمول طلایی}} \cos 10$

$2\cos^2 10 - 1 \xrightarrow{\text{فرمول طلایی}} \cos 20$

$\dfrac{1-\tan^2 20}{1+\tan^2 20} \xrightarrow{\cos 2\alpha = \frac{1-\tan^2\alpha}{1+\tan^2\alpha}} \cos 40$

$= \dfrac{\frac{1}{8}\sin 80}{\sin 10} = \dfrac{1}{8}\,\dfrac{\cos 10}{\sin 10} = \underline{\dfrac{1}{8}\cot 10}$

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$5(2\cos^2\alpha - 1) - 12\cos\alpha = 10\cos^2\alpha - 12\cos\alpha - 5 = ?$

$\sin\alpha + 3\cos\alpha = 2 \longrightarrow \sin\alpha = 2 - 3\cos\alpha \xrightarrow{\text{توان ۲}} \underset{1-\cos^2}{\sin^2\alpha} = 9\cos^2\alpha - 12\cos\alpha + 4$

$\longrightarrow 10\cos^2\alpha - 12\cos\alpha + 3 = 0 \longrightarrow 10\cos^2 - 12\cos\alpha - 5 = \underline{-8}$

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$\cos^2\dfrac{A}{2} = \dfrac{1+\cos A}{2} \qquad 2\sin B\sin C = 1 + \underbrace{\cos A}_{\cos(\pi - (B+C)) = -\cos(B+C)}$

$2\sin B\sin C = 1 - \cos(B+C) \longrightarrow 2\sin B\sin C = 1 - \cos B\cos C + \sin B\sin C$

$\longrightarrow \sin B\sin C + \cos B\cos C = 1 \longrightarrow \cos(B-C) = 1$

$\longrightarrow B = C \longrightarrow B = C = 72 \longrightarrow A = 180 - 144 = \underline{36}$