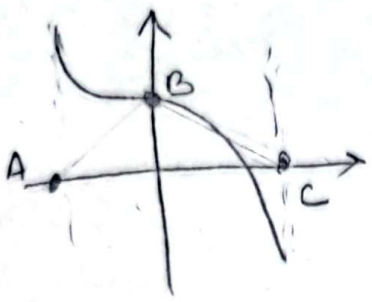


$y = \tan\left(-2x + \frac{\pi}{4}\right)$ 15/17 (1)

$y = \tan\left(\frac{\pi}{4}\right) \rightarrow y = 1 = B$

$\frac{\pi}{|b|} \rightarrow \frac{\pi}{|-2|} = \frac{\pi}{2}$

$S_{\text{مثلث}} = \frac{\text{قاعده} \times h}{2} \Rightarrow \frac{\pi}{2} \times 1 \times \frac{1}{2} = \frac{\pi}{4}$

$x^2 - (\sin\alpha)x - \frac{1}{4}\cos^2\alpha = 0$ (2) یکی از ریشه‌ها $\frac{2}{3}$

$x = \frac{2}{3} \rightarrow \left(\frac{2}{3}\right)^2 - \frac{2}{3}(\sin\alpha) - \frac{1}{4}\cos^2\alpha$

$\times 4 \rightarrow 4 - 8\sin\alpha - \cos^2\alpha$

$\cos^2\alpha = 1 - \sin^2\alpha$

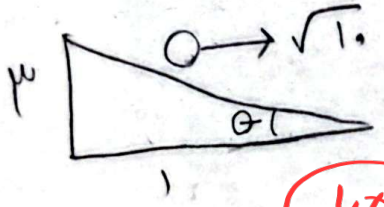
$9\sin^2\alpha - 8\sin\alpha + 3 = 0$ $\Delta = b^2 - 4ac = (-8)^2 - 4(9) = 28$

$1 + \tan^2\alpha = \frac{1}{\cos^2\alpha}$ $\tan^2\alpha = \frac{1}{(2\sqrt{2})^2} = \frac{1}{8} \rightarrow \tan^2\alpha + 1 = \frac{9}{8}$ (3)

$\log(\sin\alpha) - \log(-\cos\alpha) = \log 3$

$\sin\alpha > 0$ $\cos\alpha < 0$ $\sin\alpha - \cos\alpha = ?$

$\log\frac{-\sin\alpha}{\cos\alpha} = \log 3 \rightarrow -\tan\alpha = 3$



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

$\rightarrow \frac{2\sqrt{10}}{5}$ 1/5

(۴) $\sin^4\theta + \cos^2\theta = \frac{4}{5}$ $\qquad \cos^4\theta + \sin^2\theta = ?$

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

$\longrightarrow \cos^4\theta + \sin^2\theta = \sin^4\theta - 2\sin\theta + 1 + \sin^2\theta$

$\longrightarrow \sin^4\theta - \sin\theta + 1 = \frac{4}{5}$

-(۲) ✓

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(۵) $\frac{3\sin x + \sin x\cos x}{2 - 2\cos^2 x} < 0 \qquad \sin x\tan x - \frac{1}{\cos x} > 0$

$\frac{\sin x \times \sin}{\cos x} - \frac{1}{\cos x} > 0$

$\frac{\sin x(3 + \cos x)}{2 - 2(1 - \sin^2)} < 0 \qquad \frac{\sin^2}{\cos x} - \frac{1}{\cos x} > 0$

$\sin^2 x - 1 = -\cos^2 x \qquad \frac{1}{\cos x}(\sin^2 - 1) > 0 \rightarrow \cos x > 0$

$\frac{\sin x(3 + \cos x)}{2 - 2 + 2\sin^2} < 0 \longrightarrow \sin < 0 \qquad \frac{-\cos^2 x}{\cos x} > 0$

همواره ⊕

(۱٫۲۵)

$-\cos x > 0 \rightarrow \cos x < 0$

چون cos ها ⊕ و sin ها منفی است پس کمان ما در ناحیه‌ی ~~۴~~ است (سوم)

جواب

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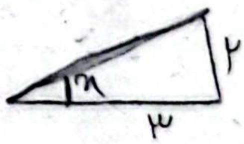
(۶) $\frac{2}{\sin x} + \frac{3}{\cos x} = 0$ حاصل $\tan x + \cot x$ را بدست آورید:

$\rightarrow \frac{2}{\sin x} = -\frac{3}{\cos x} \longrightarrow \frac{2}{-3} = \frac{\sin x}{\cos x} = \tan$



$\rightarrow \tan = -\frac{2}{3} \longrightarrow \cot = -\frac{3}{2}$

(۲) ✓

$\tan + \cot \longrightarrow -\frac{2}{3} + \left(-\frac{3}{2}\right) \Rightarrow \frac{-4-9}{6} = \frac{-13}{6}$

(7)

$$\frac{\sqrt{1+\sin 50}}{\sin 50+\sin 10}$$

$$1+\sin\theta = \left(\sin\frac{\theta}{2}+\cos\frac{\theta}{2}\right)^2$$

$$\longrightarrow \sqrt{\sin 50+1} = \sin 25+\cos 25$$

$$\sin x+\cos x = \sqrt{2}\,\sin\left(x+\frac{\pi}{4}\right)$$ (2) ✓

$$\sin 25+\cos 25 = \sqrt{2}\,\sin 70 = \sqrt{2}\cos 20$$

$$\sin p+\sin q = 2\sin\left(\frac{p+q}{2}\right)\cos\left(\frac{p-q}{2}\right)$$

درنتیجه $\longrightarrow$ $\sin 50+\sin 10 = 2\sin 30^\circ\cos 20 = \cos 20$

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

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(8)

$$\underbrace{(1-2\sin^2 5)}_{\cos 10}\underbrace{(2\cos^2 10-1)}_{\cos 20}\underbrace{\left(\frac{1-\tan^2 20}{1+\tan^2 20}\right)}_{\cos 40}$$

$$\longrightarrow (\cos 10\times\cos 20\times\cos 40)\times\frac{\sin 10}{\sin 10}$$ (2) ✓

$$\frac{\sin 10\cos 10\cos 20\cos 40}{\sin 10} = \frac{\frac{1}{8}\sin 80}{\sin 10} \Rightarrow \frac{\cos 10}{\sin 10} = \frac{1}{8}\cot 10$$

($\frac12\sin 20$, $\frac14\sin 40$; طبق متمم)

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(9) $\sin a+3\cos a=2$, $5\cos 2\alpha-12\cos\alpha$ (2) ✓

$$\sin\alpha = 2-3\cos x \longrightarrow (\sin x+3\cos x)^2 = \sin^2 x+6\sin x\cos x+9\cos^2 x = 4$$

$$(1-\cos^2 x)+9\cos^2 x+6(2-3\cos x)\cos x = 4$$

$$-10\cos^2 x+12\cos x = 3$$

$$5\cos 2x-12\cos x = 5(2\cos^2 x-1)-12\cos x \Rightarrow \underbrace{10\cos^2 x-12\cos x}_{-3}-5$$

$$\Rightarrow (-8)$$ جواب

$5 \leftarrow 10$