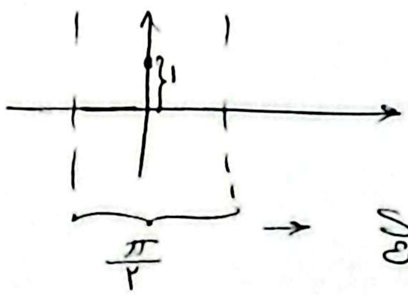
«علیرضا آقاجانی»

①



دوره تناوب ← $\frac{\pi}{\text{ضریب } x} \leftarrow \frac{\pi}{|1+1|} = \left(\frac{\pi}{2}\right)$

جایگذاری $x=0$ ← $\tan\left(\frac{\pi}{4}\right) = 1$ برای یافتن عرض از مبدأ (B)

$\to S_{\text{مثلث}} = \frac{\pi}{2} \times 1 \times \frac{1}{2} = \left(\frac{\pi}{4}\right)$

②

$x = \frac{2}{3} \to \frac{4}{9} - \frac{2}{3}\sin\alpha - \frac{1}{4}\cos^2\alpha = 0 \to \frac{1}{4}\sin^2\alpha - \frac{2}{3}\sin\alpha + \frac{7}{36}$

$\cos^2\alpha = 1-\sin^2\alpha$, $\quad \frac14\cos^2\alpha = \frac{1}{4} - \frac{1}{4}\sin^2\alpha$

$\to \Delta = \frac{4}{9} - \frac{7}{36} = \frac{9}{36}$

$\to \sin\alpha = \frac{\frac{2}{3} \pm \left(\frac{3}{6}\right)}{\frac{1}{2}} = \frac{4}{3} \pm 1$ ↗ $\frac{7}{3}$ غ ق ق ↘ $\left(\frac{1}{3}\right)$ ق ق

$\frac{1}{9} = \sin^2\alpha$

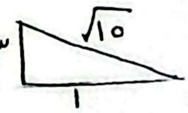
$\frac{8}{9} = \cos^2\alpha$

$1 + \tan^2 = \left(\frac{1}{\cos^2} = \frac{1}{\frac{8}{9}}\right) \to \left(\frac{9}{8}\right) \to$ جواب

③

$\log^{\sin\alpha} - \log^{-\cos\alpha} = \log^{3} \to \log^{-\frac{\sin\alpha}{\cos\alpha}} = \log^{3}$

$\to \log^{-\tan\alpha} = \log^{3} \to \tan\alpha = -3 \to$



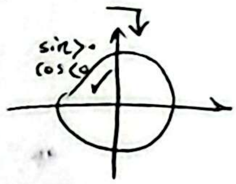
$\sin\alpha = \frac{\pm 3}{\sqrt{10}}$

$\cos\alpha = \frac{-1}{\sqrt{10}}$

شرط $\log$ ← $\sin\alpha > 0$

$\log_b^a \to a>0,\ b>0,\ b\neq 1 \to -\cos\alpha > 0$

$\cos\alpha < 0$



$\to \sin\alpha - \cos\alpha = \left(\frac{4}{\sqrt{10}}\right) \to \frac{4\sqrt{10}}{10} \to \frac{2\sqrt{10}}{5}$

④

$(\underbrace{\sin^2\theta}_{t})^2 + 1 - \sin^2\theta \to t^2 - t + 1 = \frac{4}{5} \to t^2 - t + \frac{1}{5} = 0$

$\to t = \frac{1 \pm \sqrt{\frac{1}{5}}}{2}$ ↗ $\frac{5+\sqrt{5}}{10}$ ↘ $\frac{5-\sqrt{5}}{10}$

$\sin^2\alpha = \frac{5+\sqrt5}{10}$

$\cos^2\alpha = \frac{5-\sqrt5}{10}$

$\left(\frac{5-\sqrt5}{10}\right)^2 + \frac{5+\sqrt5}{10}$

$\frac{25+5-10\sqrt5}{100}$

$\frac{3-\sqrt5}{10} + \frac{5+\sqrt5}{10} = (0.8)$

Scanned with CamScanner

(۵)

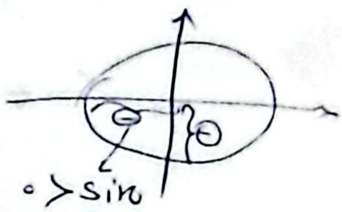
* $\frac{2\sin x + \sin x\cos x}{2-2\cos^2 x} < 0 \to \boxed{\sin x < 0}$

$2-2\cos^2 x = 2\sin^2 x \to (+)$

** $\left(\sin x \cdot \frac{\sin x}{\cos x}\right) - \frac{1}{\cos x} > 0$

$(-) \leftarrow \frac{(\sin^2 x - 1)}{\cos x} > 0 \to \boxed{\cos x < 0}$

ناحیه سوم



$0 > \sin$

$0 > \cos$

(۶)

$\frac{2}{\sin x} = -\frac{3}{\cos x} \to 2\cos x = -3\sin x$

(I) $\to \cos x = -\frac{3}{2}\sin x$

$\to \cos^2 x + \sin^2 x = 1 \to \sin^2 x = \frac{4}{13} \to \sin x = \frac{2}{\sqrt{13}}$

$\cos^2 x = \frac{9}{4}\sin^2 x$

(II) $\cos x = -\frac{3}{\sqrt{13}}$

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

(۷)

$\left(\sin\frac{\alpha}{2} + \cos\frac{\alpha}{2}\right)^2 \leftarrow 1 + \sin\alpha$

$\frac{\sqrt{1+\cos 40°}}{\cos 40° + \cos 80°}$; $\cos 80° \to 2\cos^2 40 - 1$

$(2\cos 40° - 1)(\cos 40 + 1)$

$\to \frac{1}{(2\cos 40° - 1)(\sqrt{\cos 40 + 1})}$

[illegible]

$2(2\cos^2 20° - 1) - 1 \times \sqrt{2}\sin 20°$

$4\cos^2 20° - 3$

$1 - \sin^2 20°$

$\frac{1}{(-4\sin^2 20° - 1)(\sqrt{2}\sin 20°)}$

(۸)

$\cos^2 + \sin^2 = 1$; $1-\sin^2$; $1-\cos^2$

$(1 - 2\sin^2 5°) = \cos 10°$

$(2\cos^2 10° - 1) = \cos 20°$

$\frac{1-\tan^2 20°}{1+\tan^2 20°} = \cos 40°$

$\frac{1}{2}\sin 20° \to \frac{1}{4}\sin 40° \to \frac{1}{8}\sin 80°$; $\sin 80° = \cos 10°$

$\to \cos 10 \times \cos 20 \times \cos 40 \times \frac{\sin 10}{\sin 10} \to \boxed{\frac{1}{8}\tan 10°}$