تکنیک تشریحی

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تشریحی

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$\Lambda\cos x - \tan^2 x = 1 \qquad [0, 2\pi]$ ①

$\Lambda\cos x = \tan^2 x + 1 \xrightarrow{\frac{1}{\cos^2 x}} \Lambda\cos^3 x = 1 \quad \cos^3 x = \frac{1}{\Lambda}$

$\cos x = \frac{1}{2}$  ← ۲ جواب دارد $= \frac{R}{\mu} \cdot \frac{\alpha\pi}{\mu}$ ②

$a\sin^2(\pi x) + 2\cos(2\pi x) = -2 \qquad [-\pi, \pi]$ ③

$\rightarrow a\sin^2(\pi x) + 2\cos(2\pi x) + 2 = 0 \qquad a\sin^2 \pi x + 2(\underbrace{\cos^2 \pi x + 1}_{\text{فرمول}}) = 0$

$\underbrace{a\sin^2 \pi x}_{+\text{عدد}} + \underbrace{4\cos^2 \frac{\pi x}{2}}_{+\text{عدد}} = 0 \Rightarrow$ حاصل‌جمع دو عدد مثبت

$a\sin^2 \pi x = 0 \rightarrow \sin \pi x = 0 \rightarrow \pi x = -2\pi, 0, \pi$ ①

$4\cos^2 \frac{\pi x}{2} = 0 \rightarrow \cos^2 \frac{\pi x}{2} = 0 \rightarrow \cos \frac{\pi x}{2} = \cos \frac{\pi}{2} \rightarrow \frac{\pi x}{2} = 2k\pi \pm \frac{\pi}{2}$ ②

$x = \frac{4k\pi}{2} + \frac{\pi}{2} \rightarrow -\pi, \pi$ ③

$x \in [-\pi, \pi]$

$① \cap ② \cap ③ = -\pi, \pi$ ← ۲ جواب

③

$2\sin(\pi x)\underbrace{\cos(2\pi x)}_{1-2\sin^2 \pi x} + \sin \pi x = 1$

$2\sin \pi x(1 - 2\sin^2 \pi x) + \sin \pi x - 1 = 0 \rightarrow 4\sin^3 \pi x - 2\sin \pi x + 1 = 0$ ②

$\rightarrow (\sin \pi x + 1)(4\sin^2 \pi x - 4\sin \pi x + 1) = 0 \rightarrow \sin \pi x = -1 \rightarrow x = \frac{3}{2}$

$(2\sin \pi x - 1)^2 \quad \sin \pi x = \frac{1}{2} \rightarrow x = \frac{1}{6}, \frac{5}{6}$

$\xrightarrow{\text{مجموع}} \frac{5\pi}{3}$

Arman

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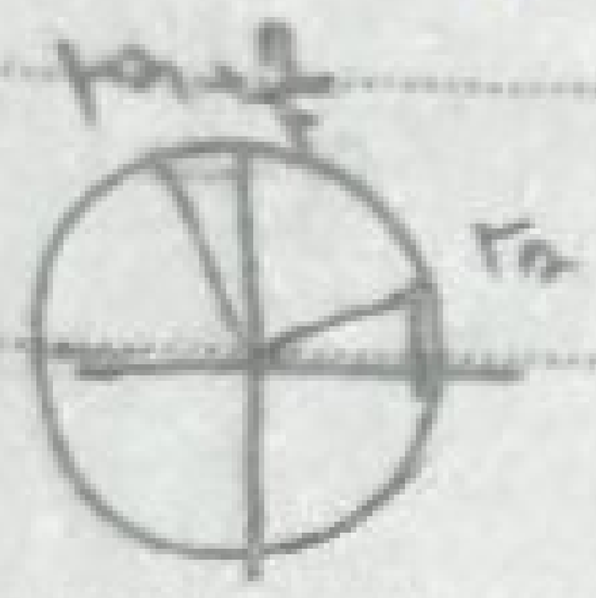
$$\frac{1}{\sin(\frac{\pi}{2}+3x)} + \frac{1}{\cos(\frac{\pi}{2}+4x)} = 0$$

$\sin(\frac{\pi}{2}+3x) \to \cos 3x$, $\cos(\frac{\pi}{2}+4x) \to -\sin 4x$



$\cos 3x = \cos(\frac{\pi}{2} - 4x)$

$3x = 2k\pi \pm (\frac{\pi}{2} - 4x)$

$7x = \frac{2k\pi}{7} + \frac{\pi}{2} \to \frac{\pi}{14} , \frac{5\pi}{14}$

$-x = 2k\pi - \frac{\pi}{2} \longrightarrow$ گزینه حذف نشان می‌شود

$a = \frac{5\pi}{14} - \frac{\pi}{14} = \frac{\pi}{3} \to \tan(2 \times \frac{\pi}{3}) = -\sqrt{3}$ ✓ ۲

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$m(\cos x - \sin x) - 3\sqrt{6}\sin(2x) = \sqrt{6}$

$\cos(x+\frac{\pi}{4}) = \frac{1}{\sqrt{3}} \longrightarrow \cos x \times \frac{\sqrt{2}}{2} - \sin x \times \frac{\sqrt{2}}{2} = \frac{1}{\sqrt{3}}$ ۲

$\cos x - \sin x = \frac{\sqrt{2}}{\sqrt{3}}$ ★ $\xrightarrow{(\ )^2} 1 - \sin 2x = \frac{2}{3} \to \sin 2x = \frac{1}{3}$ ★

$m(\frac{\sqrt{2}}{\sqrt{3}}) - \sqrt{6} = \sqrt{6} \quad 2\sqrt{6} \to m = \frac{2\sqrt{6}}{\sqrt{2}} \times \frac{\sqrt{3}}{\sqrt{2}} = 6$ ✓

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$\sin(x+\frac{\pi}{4})\cos(x-\frac{\pi}{4}) = 1 \quad [0, 2\pi]$

$\cos(x-\frac{\pi}{4}) \to \cos(\frac{\pi}{4}-x) \Rightarrow x + \frac{\pi}{4} + \frac{\pi}{4} - x = \frac{\pi}{2}$ → متمم هستند

$\sin^2(x+\frac{\pi}{4}) = 1 \longrightarrow \sin(x+\frac{\pi}{4}) = \pm 1$ ۲

$\Rightarrow x + \frac{\pi}{4} = k\pi + \frac{\pi}{2} \to x = k\pi + \frac{\pi}{4}$ ✓ $\xrightarrow{[0, 2\pi]} \frac{\pi}{4} , \frac{5\pi}{4}$

۲ جواب دارد

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$\sin x + \sqrt{3}\cos x = \sqrt{2}$ $[-2\pi, 2\pi]$ (۷)

$\frac{1}{2}\sin x + \frac{\sqrt{3}}{2}\cos x = \frac{\sqrt{2}}{2}$ (۲)

$\sin\left(\frac{\pi}{3} + x\right) = \sin\left(\frac{\pi}{4}\right) \rightarrow x + \frac{\pi}{3} = 2k\pi + \frac{\pi}{4}$ $\left(\frac{-\pi}{12}\right)$

$x + \frac{\pi}{3} = 2k\pi + \pi - \frac{\pi}{4}$ $\left(\frac{23\pi}{12}\right)$

$x \in [-2\pi, 2\pi] \rightarrow x = -\frac{\pi}{12}, \frac{23\pi}{12}, \frac{11\pi}{12}$; مجموع $= \frac{4\pi}{3}$

$4\sin x \sin\left(\frac{3\pi}{2} - x\right) = 1$ $[0, 2\pi]$ (۸)

$\cos x$ x

$\sin 2x$

$2(2\sin x \cos x) = 1 \rightarrow \sin 2x = \frac{1}{2} \Rightarrow \sin 2x = \sin\left(\frac{\pi}{6}\right)$ (۲)

$2x = 2k\pi + \frac{\pi}{6}$ $x \in [0, 2\pi]$ $\frac{\pi}{12} + \frac{13\pi}{12} + \frac{25\pi}{12} + \frac{37\pi}{12} = 13\pi$ (۱۳)

$2x = 2k\pi + \pi - \frac{\pi}{6}$

$\tan(4x)\tan(x) = 1$ $[\pi, 2\pi]$ (۱۵)

$\tan^2 x = \frac{1}{\tan x} \cot x = \tan\left(\frac{\pi}{2} - x\right)$ (۲)

$2x = k\pi + \frac{\pi}{2} - x \rightarrow 3x = k\pi + \frac{\pi}{2} \Rightarrow x = \frac{k\pi}{3} + \frac{\pi}{6}$

$x \in [k_1, k_2] \rightarrow \frac{11\pi}{6} + \frac{9\pi}{6} + \frac{13\pi}{6} + \frac{17\pi}{6} = 12\pi$

$1+\cos 2\alpha = 2\cos^2\alpha$

$\int 1+\cos 2\alpha = 2\cos^2\alpha$

$\left| 1+\cos 4\alpha = 2\cos^2 2\alpha \right.$

$\left. 1+\cos 8\alpha = 2\cos^2 4\alpha \right| \xrightarrow{?} 8\cos^2\alpha\cos^2 2\alpha\cos^2 4\alpha = \frac{1}{8}$

$\cos^2\alpha\cos^2 2\alpha\cos^2 4\alpha = \frac{1}{64} \xrightarrow{\sqrt{\ }} \cos\alpha\cos 2\alpha\cos 4\alpha = \pm\frac{1}{8} \xrightarrow[\sin\alpha\neq 0]{\times \sin\alpha}$

$(\underbrace{\sin\alpha\cos\alpha}_{\frac{1}{2}\sin 2\alpha})\cos 2\alpha\cos 4\alpha = \pm\frac{\sin\alpha}{8} \rightarrow \frac{1}{2}(\underbrace{\sin 2\alpha\cos 2\alpha}_{\frac{1}{2}\sin 4\alpha})\cos 4\alpha = \pm\frac{\sin\alpha}{8}$

$\frac{1}{2}\times\frac{1}{2}(\underbrace{\sin 4\alpha\cos 4\alpha}_{\frac{1}{2}\sin 8\alpha}) = \pm\frac{\sin\alpha}{8} \rightarrow \frac{1}{8}\sin 8\alpha = \pm\frac{\sin\alpha}{8}$

$\sin 8\alpha = \pm\sin\alpha \rightarrow \begin{cases} 8\alpha = 2k\pi + \alpha \ \cup\ 2k\pi + \pi - \alpha \\ 8\alpha = 2k\pi - \alpha \ \cup\ 2k\pi + \pi + \alpha \end{cases}$

$\alpha = \frac{2k\pi}{7} \xrightarrow{MAn\,A} k=3 \rightarrow n = \frac{6\pi}{7}$

$\alpha = \frac{2k\pi}{9} \xrightarrow{MAn\,A} k=4 \rightarrow n = \frac{8\pi}{9}$

$\alpha = \frac{(2k+1)\pi}{7} \xrightarrow{MAn\,A} k=2 \rightarrow n = \frac{5\pi}{7}$

$\alpha = \frac{(2k+1)\pi}{9} \xrightarrow{MAn\,A} k=3 \rightarrow n = \frac{7\pi}{9}$

$\rightarrow \boxed{MAn\,A = \frac{8\pi}{9}}$

* A نمی‌تواند برابر خود π باشد چون طبق $\sin\alpha$ را مخالف صفر در نظر گرفته‌ایم!