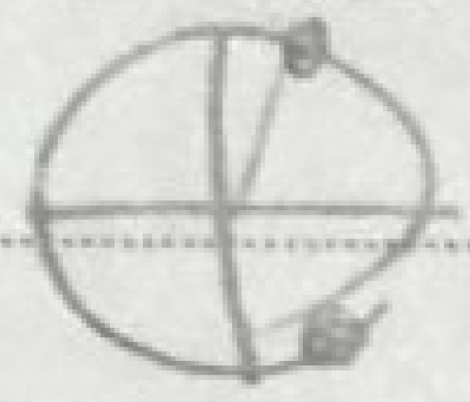
① $8\cos x - \tan^2 x = 1$ $[0, 2\pi]$

$8\cos x = \tan^2 x + 1 = \frac{1}{\cos^2 x} \rightarrow 8\cos^3 x = 1$ $\cos^3 x = \frac{1}{8}$

$\cos x = \frac{1}{2}$  → ۲ جواب دارد $= \frac{\pi}{3}, \frac{5\pi}{3}$

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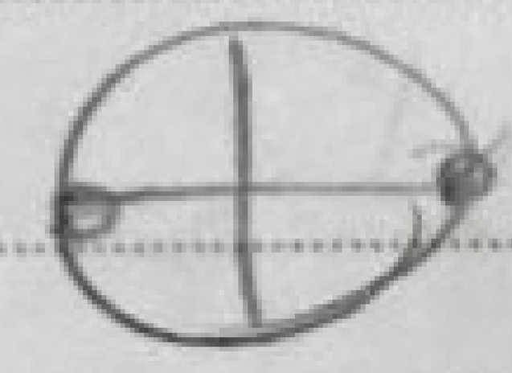
② $5\sin^2(x) + 2\cos(3x) = -2$ $[-\pi, \pi]$

→ $5\sin^2(x) + 2\cos(3x) + 2 = 0$ $5\sin^2 x + 2(\cos 3x + 1) = 0$ (فرمول طلایی)

$5\sin^2 x + 4\cos^2\frac{3x}{2} = 0$

+ یا صفر   + یا صفر $\Rightarrow$ هردو صفر بوده اند

① $5\sin^2 x = 0 \rightarrow \sin x = 0 \rightarrow x = -\pi, 0, \pi$



$4\cos^2\frac{3x}{2} = 0 \rightarrow \cos^2\frac{3x}{2} = 0 \rightarrow \cos\frac{3x}{2} = \cos\frac{\pi}{2} \rightarrow \frac{3x}{2} = 2k\pi \pm \frac{\pi}{2}$

② $x = \frac{4k\pi}{3} + \frac{\pi}{3} \rightarrow \pi, -\pi$ $\Rightarrow$ ①$\cap$② $= \pi, -\pi$ ۲ جواب

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

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③ $2\sin(x)\cos(2x) + \sin x = 1$

$\cos(2x) = 1 - 2\sin^2 x$

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

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

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

$\rightarrow \frac{5\pi}{3}$ ۴ جواب

Subject:

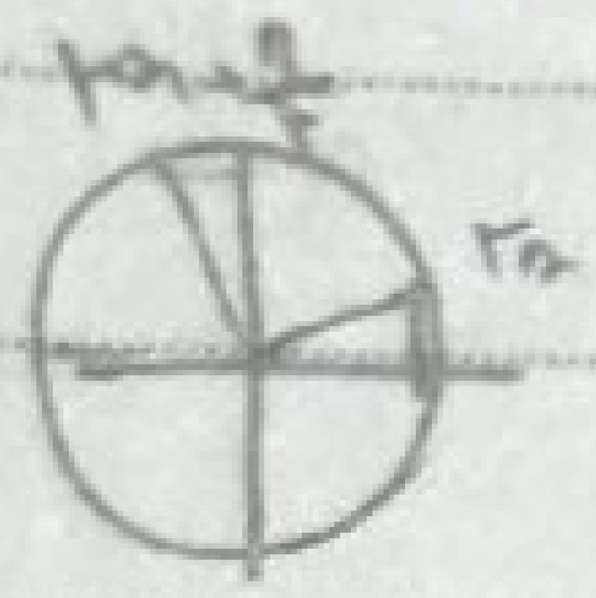
Year: Month: Day:

page: ( )

(۴)

$$\frac{1}{\sin(\frac{\pi}{2}+2x)} + \frac{1}{\cos(\frac{\pi}{2}+6x)} = 0$$

$\sin(\frac{\pi}{2}+2x) \to \cos 2x$, $\cos(\frac{\pi}{2}+6x) \to -\sin 6x$



$\cos 2x = \cos(\frac{\pi}{2} - 6x)$

$2x = 2k\pi \pm (\frac{\pi}{2} - 6x)$

$8x = 2k\pi + \frac{\pi}{2} \to \frac{\pi}{12} , \frac{5\pi}{12}$

$-4x = 2k\pi - \frac{\pi}{2} \longrightarrow$ گزینه هیچ نشان می‌شود

$a = \frac{5\pi}{12} - \frac{\pi}{12} = \frac{\pi}{3} \to \tan(2 \times \frac{\pi}{3}) = -\sqrt{3}$

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(۵)

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

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

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

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

$\sin(x+\frac{\pi}{6})\cos(x-\frac{\pi}{3}) = 1 \quad [0, 4\pi]$ (۶)

$\cos(\frac{\pi}{3} - x) \Rightarrow x + \frac{\pi}{6} + \frac{\pi}{3} - x = \frac{\pi}{2}$ → متمم‌اند

$\sin^2(x+\frac{\pi}{6}) = 1 \longrightarrow \sin(x+\frac{\pi}{6}) = \pm 1$

$\Rightarrow x + \frac{\pi}{6} = k\pi + \frac{\pi}{2} \to x = k\pi + \frac{\pi}{3} \xrightarrow{[0, 2\pi]} \frac{\pi}{3} , \frac{4\pi}{3}$ → ۲ جواب دارد

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page: ( )

Subject:
Year: Month: Day:

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

$\xrightarrow{\div 2} \frac{1}{2}\sin x + \frac{\sqrt{3}}{2}\cos x = \frac{\sqrt{2}}{2}$

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

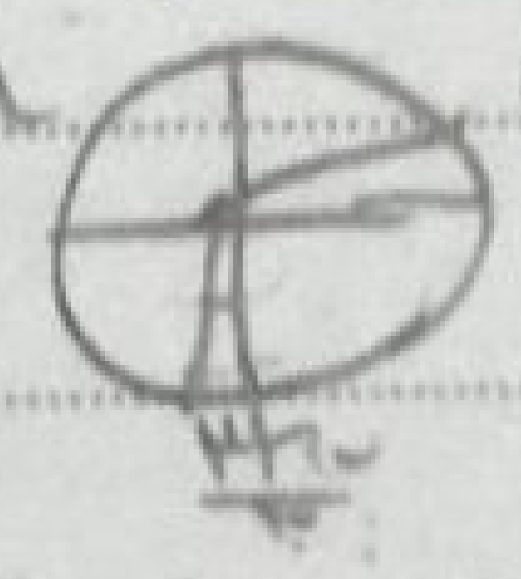
$x + \frac{\pi}{3} = 2k\pi + \pi - \frac{\pi}{4}$ $\left(\frac{5\pi}{12}\right)$

$\xrightarrow{x \in [\pi, 2\pi]} x = \frac{-\pi}{12}, \frac{5\pi}{12}, \frac{23\pi}{12}$

مج $= \frac{9\pi}{4}$

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

$-\cos x$



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

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

$2x = 2k\pi + \frac{7\pi}{6}$

$\xrightarrow{x \in [0, 2\pi]} \frac{7\pi}{12} + \frac{11\pi}{12} + \frac{19\pi}{12} + \frac{23\pi}{12} = 5\pi$

$\tan(3x)\tan(x) = 1 \qquad [\pi, 2\pi]$ ۱۰

$\tan 3x = \frac{1}{\tan x} = \cot x = \tan(\frac{\pi}{2} - x)$

$3x = k\pi + \frac{\pi}{2} - x \rightarrow 4x = k\pi + \frac{\pi}{2} \rightarrow x = \frac{k\pi}{4} + \frac{\pi}{8}$

$x \in [\pi, 2\pi] \rightarrow \frac{11\pi}{8} + \frac{9\pi}{8} + \frac{13\pi}{8} + \frac{15\pi}{8} = 6\pi$

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