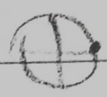
نازنین مهری — تکلیف ۱۴ — ۰۴/۹/۳

۱- الف) $\cos 2x = 3\sin x - 1 \rightarrow 1 - 2\sin^2 x - 3\sin x + 2 = 0$

$\rightarrow \begin{cases} \sin x = \frac{-1}{-2} = \frac{1}{2} \checkmark & \rightarrow x = 2k\pi + \frac{\pi}{6} \quad , \quad 2k\pi + \frac{5\pi}{6} \\ \sin x = \frac{4}{-2} = -2 \times & \end{cases}$

ب) $\cos 2x + \cos x - 2 = 0 \rightarrow 2\cos^2 x + \cos x - 3 = 0$

$\rightarrow \begin{cases} \cos x = 1 & \rightarrow x = 2k\pi \\ \cos x = \frac{-3}{2} \times & \end{cases}$

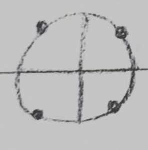


۲- الف) $\sin^4 x - \cos^4 x = \sin 4x \rightarrow -\cos 2x = \sin 4x$

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

$\Rightarrow 2x = 2k\pi \pm \frac{\pi}{2} + 4x \rightarrow -2x = 2k\pi \pm \frac{\pi}{2}$

$x = k\pi \pm \frac{\pi}{4}$



ب) $2\cos^2 x + 2\sin x\cos x = 1 \rightarrow \cos 2x + \sin 2x = 0$

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

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

۳- الف) $\cot x(2\cos x+1)=\frac{1}{\sin x} \rightarrow \frac{2\cos^2 x+\cos x}{\sin x}=\frac{1}{\sin x}$

$\sin x\neq 0 \rightarrow x\neq k\pi$ $\quad 2\cos^2 x+\cos x-1=0 \rightarrow$

$\cos x=-1$ ✗

$\cos x=\frac{1}{2}$ ✓ $\quad 2k\pi\pm\frac{\pi}{3}$

ب) $2\sin^2 x-\sin x\cos x+\cos^2 x=2 \rightarrow \sin^2 x-\sin x\cos x=1$

$\tan^2 x-\tan x=1+\tan^2 x \rightarrow \tan x=-1 \quad x=k\pi-\frac{\pi}{4}$

$\cos\left(\frac{\pi}{4}-x\right)=\sin\left(\frac{\pi}{4}+x\right)$

۴- الف) $\cos\left(\frac{\pi}{4}+x\right)\cos\left(x-\frac{\pi}{4}\right)=\frac{1}{4}$

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

$\rightarrow 2x=2k\pi\pm\frac{\pi}{3} \rightarrow x=k\pi\pm\frac{\pi}{6}$

ب) $\cos\left(2x-\frac{\pi}{9}\right)=\sin(-2x)=\cos\left(\frac{\pi}{2}+2x\right)$

$\rightarrow 2x-\frac{\pi}{9}=2k\pi+\frac{\pi}{2}+2x$ ✗

$2x-\frac{\pi}{9}=2k\pi-\frac{\pi}{2}-2x \rightarrow 4x=2k\pi-\frac{7\pi}{18}$

$\rightarrow x=\frac{k\pi}{2}-\frac{7\pi}{72}$

$\frac{2\sin 2m\cos 2m}{\sin 2m}+\sin 2m \quad \sin 2m\neq 0 \rightarrow x\neq\frac{k\pi}{2}$

ج) $\sin^2 x=\cos^2 x \rightarrow 2\cos 4x+1=1$

$\cos 4x=0 \rightarrow x=\frac{k\pi}{2}+\frac{\pi}{8}$

$$\frac{\sin\frac{x}{2}}{1+\cos\frac{x}{2}} \cdot \frac{1+\cos\frac{x}{2}}{\sin\frac{x}{2}} \rightarrow \sin^2\frac{x}{2} = \left(1+\cos\left(\frac{x}{2}\right)\right)^2 \quad -4$$

$$\rightarrow 1-\cos^2 t = 1+2\cos t+\cos^2 t$$

$$+\cos^2 t+\cos t = 0 \rightarrow \cos\frac{x}{2} = 0 \rightarrow x = 2k\pi+\pi \ \ I$$

$$\cos\frac{x}{2} = -1 \rightarrow x = 4k\pi+2\pi \ \ II$$

$$I: \begin{array}{c|cc} k & 0 & 1 \\ \hline x & \pi & 3\pi \end{array} \qquad II: \begin{array}{c|cc} k & 0 & 1 \\ \hline x & 2\pi & 6\pi \end{array} \qquad 3\pi-\pi=\pi$$

$$\cos^2 x - \sin^2 x\cos 2x = 1 = \cos^2 m + \sin^2 m \rightarrow \sin^2 m(1-\cos 2m) = 0 \quad -5$$

$$\rightarrow \frac{(1-\cos 2x)(1-\cos^2 m)}{2} = 0 \rightarrow \begin{cases} 1=\cos 2x \rightarrow x = k\pi \ \ I \\ 1=\cos^2 x \rightarrow x = \frac{2k\pi}{3} \ \ II \end{cases}$$

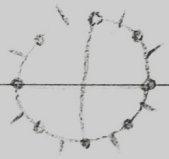
$$I: \begin{array}{c|ccc} k & 0 & 1 & 2 \\ \hline x & 0 & \pi & 2\pi \end{array} \qquad II: \begin{array}{c|cccc} k & 0 & 1 & 2 & 3 \\ \hline x & 0 & \frac{2\pi}{3} & \frac{4\pi}{3} & 2\pi \end{array}$$

جواب

$$\frac{1-\tan x}{1+\tan x} = \tan^2 x \rightarrow \frac{\tan\frac{\pi}{4}-\tan x}{1+\tan\frac{\pi}{4}\tan x} = \tan\left(\frac{\pi}{4}-x\right) \quad -8$$

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

$$\rightarrow \frac{\pi}{12}+\frac{k\pi}{4} = x$$



$$\sqrt{1+\sin 2m} = \sqrt{2}\cos 2x \rightarrow \sin+\cos = \sqrt{2}\cos 2x \quad -9$$

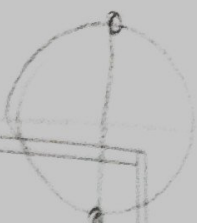
$$= \sqrt{2}\sin\left(x+\frac{\pi}{4}\right) \rightarrow \cos^2 x = \cos\left(\frac{\pi}{4}-x\right)$$

$$2x = 2k\pi+\frac{\pi}{4}-x \rightarrow 3x = 2k\pi+\frac{\pi}{4} \rightarrow x = \frac{2k\pi}{3}+\frac{\pi}{12} \ \ I$$

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

$$I: \begin{array}{c|ccc} k & 0 & 1 & 2 \\ \hline x & \frac{\pi}{12} & \frac{9\pi}{12} & \frac{17\pi}{12} \end{array} \qquad II: \begin{array}{c|cc} k & 0 & 1 \\ \hline x & \frac{\pi}{4} & x \end{array}$$

جواب



$x = K\pi - \frac{\pi}{2}$

الف) $\sin^{4}x - \cos^{4}x = 1 \rightarrow -\cos 2x = -1 \rightarrow 2x = 2K\pi - \pi$ ـ ۱ نمره

ب) $\sin^{2}x - \cos^{2}x = -1 \rightarrow x = 2K\pi$