/ /　　　　　　　　　　　　　　　　　　　　　　سحر کریمی

الف) $\cos 2x = 3\sin x - 1 \rightarrow 1 + \cos 2x = 3\sin x$ (1

$2\sin^2 x = 3\sin x \rightarrow \begin{cases} \sin x = 0 \ \checkmark \\ \sin x = \frac{3}{2} \ \times \end{cases}$

$\boxed{x = k\pi}$

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

$2\cos^2 x + \cos x - 3 = 0 \rightarrow \cos^2 x + \cos x - 6 = 0 \rightarrow$

$(\cos x + 3)(\cos x - 2) = 0 \rightarrow \begin{cases} \cos x = \frac{2}{2} = 1 \ \checkmark \\ \cos x = \frac{-3}{2} \ \times \end{cases}$

$\boxed{x = 2k\pi}$

الف) $\underbrace{(\cancel{\sin^2 + \cos^2})}_{1}(\sin^2 - \cos^2) = \sin 4x \rightarrow -\cos 2\alpha = \sin 4\alpha$ (2

$2\sin 2\alpha \cancel{\cos 2\alpha} = -\cancel{\cos 2\alpha} \rightarrow \sin 2\alpha = \frac{-1}{2} \rightarrow \begin{cases} 2\alpha = 2k\pi - \frac{\pi}{6} \\ 2\alpha = 2k\pi - \frac{5\pi}{6} \end{cases}$

$\rightarrow \begin{cases} \alpha = k\pi - \frac{\pi}{12} \\ \alpha = k\pi - \frac{5\pi}{12} \end{cases}$

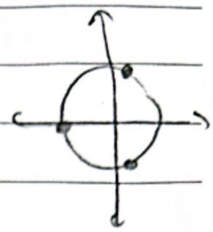
ب) $2\cos^2 x + \sin 2x = 1 \xrightarrow{-1} 2\cos^2 x - 1 + \sin 2x = 0$

$\cos 2\alpha = -\sin 2\alpha \rightarrow \begin{cases} 2\alpha = 2k\pi + \frac{3\pi}{4} \rightarrow \alpha = k\pi + \frac{3\pi}{8} \\ 2\alpha = 2k\pi + \frac{7\pi}{4} \rightarrow \alpha = k\pi + \frac{7\pi}{8} \end{cases}$

/ /

(۳ الف) $\frac{\cos x}{\cancel{\sin x}}(2\cos x+1)=\frac{1}{\cancel{\sin x}} \rightarrow \sin x \neq 0$

$$2\cos^2\alpha+\cos\alpha-1=0 \rightarrow \begin{cases}\cos\alpha=-1\\ \cos\alpha=\frac{1}{2}\end{cases}$$



ج: $\begin{cases}2k\pi+\pi\\ 2k\pi\pm\frac{\pi}{3}\end{cases}$

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

$$\begin{cases}\cos\alpha=0 \rightarrow \alpha=2k\pi\\ -\sin x=\cos\alpha \rightarrow \begin{cases}\alpha=2k\pi+\frac{3\pi}{4}\\ \alpha=2k\pi+\frac{7\pi}{4}\end{cases}\end{cases}$$

(۴ الف) $\cos$ متمم $\rightarrow$ خطا است

$$\cos(\frac{\pi}{4}+x)\underbrace{\cos(\frac{\pi}{2}-x)}=\frac{1}{4}$$

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

$$\sin(x+\frac{\pi}{2})=\frac{1}{2} \rightarrow \begin{cases}x+\frac{\pi}{2}=2k\pi+\frac{\pi}{6} \rightarrow \boxed{x=2k\pi-\frac{\pi}{3}}\\ x+\frac{\pi}{2}=2k\pi+\frac{5\pi}{6}\end{cases}$$

$$\boxed{x=2k\pi+\frac{\pi}{3}}$$

۶) $\sin\left(\frac{\pi}{۲} - ۲x + \frac{\pi}{۹}\right) = \sin(-۲x)$

$$\begin{cases} \cancel{-۲x} = ۲k\pi + \frac{\pi}{۲} \cancel{-۲x} + \frac{\pi}{۲} \rightarrow ۲k\pi = -\pi \rightarrow k \notin \mathbb{Z} \rightarrow \times \\ ۲x = ۲k\pi - \frac{\pi}{۲} + ۲x - \frac{\pi}{۹} \rightarrow -۴x = ۲k\pi - \frac{۱۱\pi}{۱۸} \end{cases}$$

$$\boxed{x = -\frac{k\pi}{۲} + \frac{۱۱\pi}{۷۲}}$$

$$\frac{\sin ۴x + \sin ۲x}{\sin ۲x} = ۱ \rightarrow \sin ۴x + \cancel{\sin ۲x} = \cancel{\sin ۲x}$$ (۵

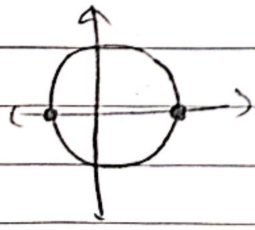
$$\sin ۴x = ۰ \rightarrow ۴x = k\pi \rightarrow \boxed{x = \frac{k\pi}{۴}}$$

$$\frac{x}{۲} = \alpha \rightarrow \frac{\sin\alpha}{۱ + \cos\alpha} = \underbrace{\frac{۱}{\sin\alpha} + \cot\alpha}_{\frac{\cos\alpha + ۱}{\sin\alpha}}$$ (۶

$$\rightarrow \tan\frac{\alpha}{۲} = \cot\frac{\alpha}{۲} \rightarrow \tan\frac{x}{۴} = \cot\frac{x}{۴} \rightarrow \left\{ \frac{x}{۴} = k\pi + \frac{\pi}{۴} \right.$$

$$\rightarrow \left\{ x = ۲k\pi + \pi \rightarrow \begin{cases} k = -۱ \rightarrow x = -\pi \\ k = ۰ \rightarrow x = \pi \end{cases} \right\} \; |-۲\pi| = ۲\pi$$

$$\sin^۲\alpha \times \cos^۳\alpha = \sin^۲\alpha \rightarrow \begin{cases} \sin^۲\alpha = ۰ \rightarrow \alpha = k\pi \\ \cos^۳\alpha = -۱ \rightarrow \alpha = ۲k\pi + \pi \\ \cos\alpha = -۱ \end{cases}$$ (۷



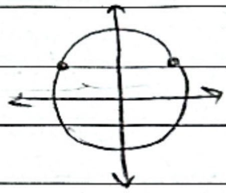
→ جواب ۳

(۸ $\frac{1-\tan\alpha}{1+\tan\alpha} \xrightarrow{\times(1+\tan\alpha)} \frac{1-\tan^2\alpha}{1+\tan^2\alpha} = \cos 2\alpha$

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

(۹ $1+\sin x = \frac{2\cos 2\alpha}{1-2\sin^2\alpha} \to 1+\sin\alpha = 2-4\sin^2\alpha$

$\to 4\sin^2\alpha + \sin\alpha - 1 = 0 \to \left\{ \sin\alpha = \frac{\pm\sqrt{17}-1}{8} \right.$

$\xrightarrow{[0,\pi]} \sin\alpha = \frac{\sqrt{17}-1}{8} \to$  $\to$ ۲ جواب دارد

الف) (۱۰ $(\sin^2-\cos^2)(\underbrace{\sin^2+\cos^2}_{1}) = 1 \to \sin^2-1 = \cos^2\alpha$

$\to -\cos^2\alpha = \cos^2\alpha \to \cos\alpha = 0 \to \alpha = k\pi+\frac{\pi}{2}$

$\to \alpha = \frac{\pi}{2}, \frac{3\pi}{2}$

ب)