باسمه تعالی

[illegible] A

تکلیف شماره ۱۴

۱- الف) $\cos 2x = 3\sin x - 1 \Rightarrow \underbrace{1-\sin^2 x - \sin^2 x}_{\cos 2x} = 3\sin x - 1$

$\Rightarrow 2\sin^2 x + 3\sin x - 2 = 0 \longrightarrow \sin^2 x + 3\sin x - 4$

$(\cancel{\sin x + 2})(2\sin x - 1)$

-2 غ ق ق $\quad \frac{1}{2}$

$\Rightarrow \sin x = \sin \frac{\pi}{6}$

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

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

$\Rightarrow 2\cos^2 x + \cos x - 3 = 0 \Rightarrow \cos x = -\frac{3}{2}$ غ ق ق ، $\cos x = 1$

$\Rightarrow x = 2k\pi$

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

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

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

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

ج) $2\cos^2 x + 2\sin x \cos x = \sin^2 x + \cos^2 x \Rightarrow \sin 2x = -\cos 2x$

$\Rightarrow -\tan ۲x = ۱ \Rightarrow \tan ۲x = -۱ \rightarrow ۲x = k\pi - \frac{\pi}{۴} \Rightarrow x = k\pi - \frac{\pi}{۸}$

ث) $\cot x (۲\cos x + ۱) = \sin x^{-۱} \Rightarrow ۲\cos^۲ x + \cos x - ۱ = ۰ - ۲$

$\Rightarrow \cos^۲ x + \cos x - ۲ = ۰ \Rightarrow \cos x = ۱$ غ ق ق $\Rightarrow \sin x = ۰$

و) $\cos x = \frac{۱}{۲}$

$\Rightarrow x = ۲k\pi + \frac{\pi}{۳} , ۲k\pi - \frac{\pi}{۳}$

ج) $۲\sin^۲ x - \sin x \cos x + \cos^۲ x = ۲ \Rightarrow ۲\sin^۲ x + ۲\cos^۲ x -$

$\sin x \cos x = \cos^۲ x \Rightarrow \cos x = -\sin x \Rightarrow \cos x = \cos(\frac{\pi}{۲} + x)$

$\Rightarrow \frac{\pi}{۲} + x = ۲k\pi - x \Rightarrow ۲x = ۲k\pi - \frac{\pi}{۲} \Rightarrow x = k\pi - \frac{\pi}{۴}$

ح) $\cos(\frac{\pi}{۴} + x) \cos(x - \frac{\pi}{۴}) = \frac{۱}{۴} \Rightarrow \cos(\frac{\pi}{۴} + x) - ۴$

$\sin(\frac{\pi}{۴} + x) = \frac{۱}{۴} \Rightarrow \sin(۲x + \frac{\pi}{۲}) = \frac{۱}{۲} \Rightarrow \cos ۲x = \frac{۱}{۲}$

$\Rightarrow ۲x = ۲k\pi \pm \frac{\pi}{۳} \Rightarrow x = k\pi \pm \frac{\pi}{۶}$

ج) $\cos(۲x - \frac{\pi}{۹}) = -\sin ۴x \rightarrow \cos(۲x - \frac{\pi}{۹}) = \cos(\frac{\pi}{۲} + ۴x)$

$\Rightarrow ۲x - \frac{\pi}{۹} = ۲k\pi + \frac{\pi}{۲} + ۴x \rightarrow ۴x = ۲k\pi - \frac{۷\pi}{۱۸}$

$\Rightarrow x = \frac{k\pi}{۲} - \frac{۷\pi}{۷۲}$

$$\sin^2 x + \cos^2 x = 1$$

$$\frac{\sin 4x + \sin 2x}{\sin 2x} - \sin^2 x = \cos^2 x \Rightarrow \frac{\sin 2x(2\cos 2x + 1)}{\sin 2x} = 1$$ -۵

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

$$\frac{1}{\sin\frac{x}{2}} + \cot\frac{x}{2} \Rightarrow \frac{\sin\frac{x}{2}}{1+\cos\frac{x}{2}} = \frac{1+\cos\frac{x}{2}}{\sin\frac{x}{2}} \Rightarrow$$ -۶

$$\tan\frac{x}{4} = \cot\frac{x}{4} \Rightarrow \tan\frac{x}{4} = \pm 1 \Rightarrow \frac{x}{4} = k\pi \pm \frac{\pi}{4}$$

$x = 4k\pi + \pi$ و $x = 4k\pi - \pi$ $\xrightarrow[\text{بازه}]{\text{[illegible]}} \pi, -\pi$

$$\cos^2 x - \sin^2 x \cos 3x = 1 \Rightarrow \cos 3x = -1 \Rightarrow 3x = 2k\pi + \pi$$ -۷

$$\cos^2 x + \sin^2 x \Longleftarrow \sin^2 x = 0 \Rightarrow x = k\pi$$

$\Rightarrow x = \frac{2}{3}k\pi + \frac{\pi}{3} \Rightarrow$ جواب ها ✓

$$\frac{1-\tan x}{1+\tan x} = \tan 3x \Rightarrow \tan\left(\frac{\pi}{4} - x\right) = \tan 3x \Rightarrow 3x = k\pi + \frac{\pi}{4} - x$$ -۸

$$\tan\left(\frac{\pi}{4} - x\right)$$

$$\Rightarrow 4x = k\pi + \frac{\pi}{4} \Rightarrow x = \frac{k\pi}{4} + \frac{\pi}{16}$$

$$\cos x \neq 0 \Rightarrow x \neq 2k\pi \pm \frac{\pi}{2} \qquad \cos 3x \neq 0 \Rightarrow x \neq \frac{k\pi}{3} \pm \frac{\pi}{6}$$

$$\tan x \neq -1 \Rightarrow x \neq k\pi + \frac{3\pi}{4}$$

۹ـ $\sqrt{1+\sin 2x} = \sqrt{2}\cos 2x \Rightarrow \sin x + \cos x = \sqrt{2}\cos 2x$

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

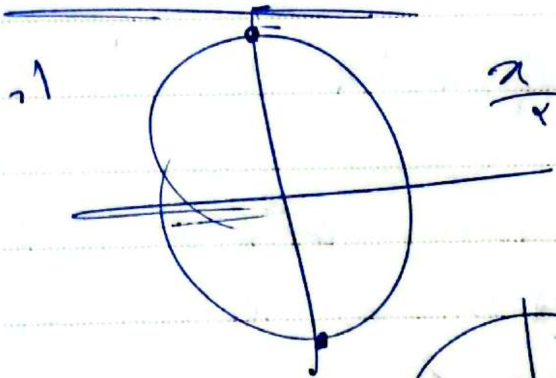
$\Rightarrow x - \frac{\pi}{4} = 2k\pi + 2x \Rightarrow x = -2k\pi - \frac{\pi}{4}$ غ ق ق

$x - \frac{\pi}{4} = 2k\pi - 2x \Rightarrow x = \frac{2k\pi}{3} + \frac{\pi}{12} \Rightarrow k=1, k=0, k=2$

۳ جواب ـ د

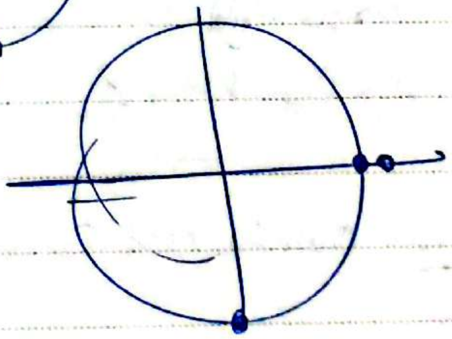
۱۰ـ

(الف) $\sin^4 x - \cos^4 x = 1$



$\frac{\pi}{2}, \frac{3\pi}{2}$

ب) $\sin^3 x - \cos^3 x = -1$



$\frac{3\pi}{2}, 2\pi, 0$