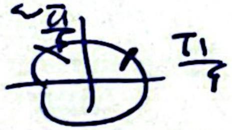
سوال ۱

الف) $\cos 2x = 3\sin x - 1$

$1 - 2\sin^2 = 3\sin - 1 \rightarrow 2\sin^2 + 3\sin - 2 = 0$

$\sin^2 + 3\sin - 4 = (\sin + 4)(\sin - 1) =$ $\quad -4 \quad 1$

$\sin x = \frac{1}{2}$




غ ق ق $(-2)$ ، $(\frac{1}{2})$ ق ق

$$\boxed{x = 2k\pi + \frac{\pi}{6} \ , \ 2k\pi + \frac{5\pi}{6}}$$

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

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

$(\cos + 3)(\cos - 2) = 0$ $\quad -3 \quad 2$

ق ق غ $(-3)$ ، $(1)$ ق ق

$\cos x = 1 \rightarrow \boxed{x = 2k\pi}$

سوال ۲

الف) $\sin^4 x - \cos^4 x = \sin 4x$

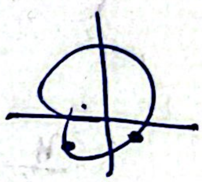
$(\sin^2 - \cos^2)(\sin^2 + \cancel{\cos^2}) = \sin 4x$

$-\cos 2x = \sin 4x \rightarrow -\cancel{\cos 2x} = 2\sin 2x \cancel{\cos 2x}$

$2\sin 2x = -1 \rightarrow \sin 2x = -\frac{1}{2} \rightarrow \frac{7\pi}{6} \quad \frac{11\pi}{6}$

$2x = 2k\pi - \frac{\pi}{6} \rightarrow \boxed{x = k\pi - \frac{\pi}{12}}$

$2x = 2k\pi - \frac{5\pi}{6} \rightarrow \boxed{x = k\pi - \frac{5\pi}{12}}$



ب) $2\cos^2 + 2\sin x \cos x = 1$

$2\cos^2 - 1 + 2\sin x \cos x = 0$

$\cos 2x + \sin 2x = 0 \rightarrow \frac{\pi}{4}$ حاده

در ربع ۴,۲

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

Scanned with CamScanner

سوال ۳

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

$2\cos^2+\cos=1 \to 2\cos^2+\cos-1=0$

$\cos^2+\cos-2=0$

$(\cos+2)(\cos-1)=0$

$-2 \quad 1 \to -\frac{2}{2} , \frac{1}{2}$

۱- غ ق ق. میان ریشه مجرد رله ی کنه

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

سوال ۳ ب

$۲\sin^۲ - \sin\cos + \cos^۲ = ۲$

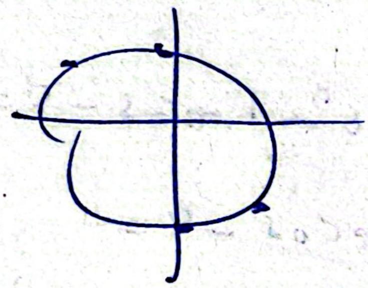
$\sin^۲ - \sin\cos = ۱$

$\sin^۲ \cancel{+\sin^۲} - \sin\cos \cancel{+\cos^۲} = ۲$

$۱$

$-\sin\cos - \cos^۲ = ۰$

$\cos(-\sin - \cos) = ۰$



$\cos ۰ \rightarrow k\pi + \frac{\pi}{۲}$

$\cos = -\sin \rightarrow k\pi - \frac{\pi}{۴}$

سوال ۶

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

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

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

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

$\cos 2x=\frac{1}{2}$

$\cancel{2k\pi \quad 2k\pi}$

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

$x=k\pi\pm\frac{\pi}{6}$

۴ ت

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

$$\cos(2x - \frac{\pi}{9}) = \cos(2x + \frac{\pi}{2})$$

$$2x - \frac{\pi}{9} = 2k\pi + 2x + \frac{\pi}{2} \quad \times$$

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

$$4x = 2k\pi + \frac{\pi}{9} - \frac{\pi}{2}$$

$$\cancel{\frac{2\pi}{18} - \frac{9\pi}{18}} = -\frac{7\pi}{18}$$

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

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

+1

$$\frac{\sin 4x + \sin 2y}{\sin 2x} \underbrace{- \sin^2 x = \cos^2 x}_{+1}$$

$$\frac{\sin 4x + \sin 2y}{\sin 2x} = 1$$

$$\sin 4x + \cancel{\sin 2x} = \cancel{\sin 2y}$$

$$\sin 4x = 0 \rightarrow 4x = k\pi \rightarrow x = \frac{k\pi}{4}$$

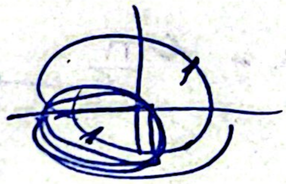
$$\tan\frac{\alpha}{2} = \frac{\sin}{1+\cos} \rightarrow \tan\frac{x}{4} = \frac{\sin\frac{x}{2}}{1+\cos\frac{x}{2}}$$

$$\tan\frac{x}{4} = \frac{1}{\tan\frac{x}{4}} \quad \frac{\cos\frac{x}{2}}{\cancel{\sin\frac{x}{2}}} \times \cancel{\sin\frac{x}{2}} = \frac{1+\cos\frac{x}{2}}{\sin\frac{x}{2}}$$

$$\frac{1}{\tan\frac{x}{4}}$$

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

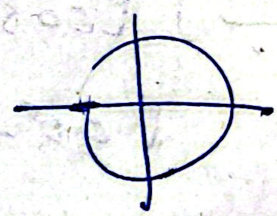
$$\frac{x}{4} = 2k\pi + \frac{\pi}{4}$$



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

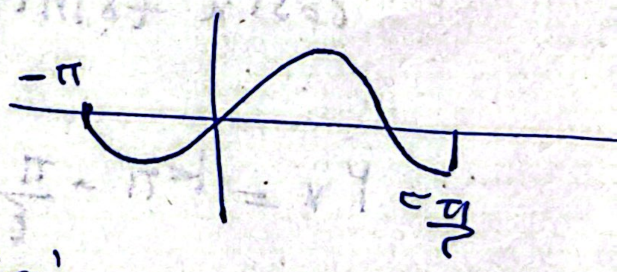
$$\frac{5\pi}{4}$$

$$\boxed{x = 8k\pi + 5\pi}$$



$$\boxed{x = 8k\pi + \pi}$$

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



$$\boxed{x = 8k\pi + 3\pi}$$

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

$$\pi - \pi + \pi = \pi$$

سوال ۲

$$\cancel{\cos^2} - \sin^2 \cos 2x = \cancel{1} \quad \sin^2$$

$$\sin^2 + \sin^2 \cos 2x = 0$$

$$\sin^2(1 + \cos 2x) = 0 \rightarrow \sin^2 = 0 \rightarrow k\pi$$

$$\cos 2x + 1 = 0 \rightarrow \cos 2x = -1$$

$$2x = 2k\pi + \pi \quad x = \frac{2k\pi}{2} + \frac{\pi}{2}$$

تعداد جواب در بازه $[0, 2\pi]$

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

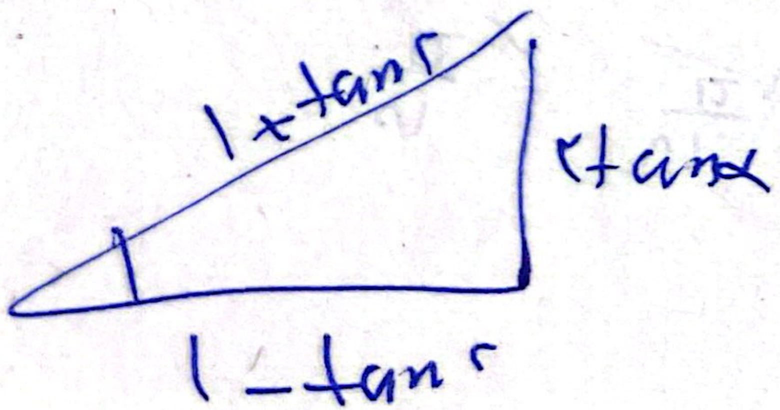
۵ جواب

(سؤال ٨)

$$\frac{1-\tan\alpha}{1+\tan\alpha} = \tan^{x}\alpha$$

$$\frac{1-\frac{\sin\alpha}{\cos\alpha}}{1+\frac{\sin\alpha}{\cos\alpha}} = \frac{\frac{\cos-\sin}{\cos}}{\frac{\cos+\sin}{\cos}} = \frac{\cos-\sin}{\cos+\sin} = \frac{\sin(y}{\cos(y}$$

l.



(سوال ۹)

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

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

$$\sin 2x = \cancel{2\cos^2 2x - 1} \longrightarrow \sin 2x = \cos 4x$$

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

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

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

$$x = \frac{k\pi}{3} + \frac{\pi}{12}$$

حل‌ها

الف ) $\sin^4 - \cos^4 = 1$

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

پس

$\sin^2 - \cos^2 = 1 \to -\cos 2x = 1 \to \cos 2x = -1$ ($2k\pi + \pi$)

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

جواب‌ها
در بازه $[0, 2\pi)$ $\to \frac{\pi}{2}$ و $\frac{3\pi}{2}$ ، ۰

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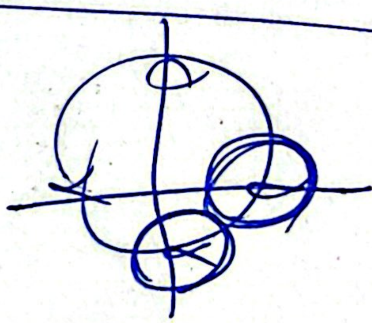
ب ) $\sin^2 x - \cos^2 x = -1$

بررسی از نقطه مرزی



$\boxed{2k\pi ، \frac{3\pi}{2}}$

فاطمه رستمیان     ۱۲ نمره