۱۹/۷۵ آفرین خیلی خوب نوشتی :))

بهار رزازی
تکلیف: ۱۴

NOTE: DATE: / / SUBJECT:

۱-

الف) $1 - 2\sin^2\alpha = 3\sin x - 1$ $\quad 2\sin^2\alpha + 3\sin\alpha - 2 = 0$ $\quad -\frac{4}{2} = -2$ غق

$\sin^2\alpha + 3\sin\alpha - 4 = 0$ $\quad (\sin\alpha - 1)(\sin\alpha + 4)$ $\quad \frac{1}{2}$ ۲

$\sin\alpha = \frac{1}{2}$ $\quad \alpha = 2k\pi + \frac{\pi}{6}$ $\quad \alpha = 2k\pi + \frac{5\pi}{6}$

ب) $2\cos^2\alpha - 1 + \cos\alpha - 2 = 0$ $\quad 2\cos^2\alpha + \cos\alpha - 3 = 0$ $\quad a+b+c=0$ $\quad 1$, $-\frac{3}{2} = \frac{c}{a}$ غق

$\cos\alpha = 1$ $\quad \alpha = 2k\pi$

۲-

الف) $(\sin^2 x - \cos^2 x)(\sin^2 x + \cos^2 x) = \sin 4x$ $\quad -\cos 2x = \sin 4x$

$\sin(\frac{3\pi}{2} + 2x) = \sin 4x$ $\quad 4x = 2k\pi + \frac{3\pi}{2} + 2x \to x = k\pi + \frac{3\pi}{4}$

$4x = 2k\pi + \pi - \frac{3\pi}{2} - 2x$ $\quad x \to \frac{k\pi}{3} - \frac{\pi}{12}$ ۲

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

$\sin 2x = \sin(\frac{3\pi}{2} + 2x)$ $\quad 2x = 2k\pi + \frac{3\pi}{2} + 2x$ ✗

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

۳-

$\frac{1}{\sin} = \frac{2\cos^2 x}{\sin x} + \frac{\cos}{\sin}$ $\quad \frac{\cos}{\sin}(2\cos x + 1) = \frac{1}{\sin}$

الف) $\cot x(2\cos x + 1) = \frac{1}{\sin x}$ $\quad 2\cos^2 x + \cos = 1$ $\quad 2\cos^2 x + \cos x - 1 = 0$

$\sin x \neq 0$ $\quad \cos x = \frac{1}{2}$ $\quad x = 2k\pi \pm \frac{\pi}{3}$

$a + c = b$ $\quad +\frac{1}{2}$, -1 $\quad \cos x = -1$ $\quad x = 2k\pi + \pi \to$ غق نباید باشد چون $\sin \neq 0$ ۲

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

$\cancel{2} - 2\cos^2 x - \sin\cos + \cos^2 x = \cancel{2}$ $\quad -\cos^2 x - \sin\cos x = 0$ $\quad \cos x(-\cos - \sin) = 0$

$\cos x = 0$ $\quad x = k\pi + \frac{\pi}{2}$ $\quad -\cos x - \sin x = 0$ $\quad -\cos x = \sin x$ $\quad x = k\pi - \frac{\pi}{4}$

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

$-\sin\left(x-\frac{\pi}{4}\right)\cos\left(x-\frac{\pi}{4}\right)=\frac{1}{4}$ $\quad -\sin\left(2x-\frac{\pi}{2}\right)=\frac{1}{2}$ ۲

$\cos 2x=\frac{1}{2}$ $\quad 2x=2k\pi\pm\frac{\pi}{3}$ $\quad x=k\pi\pm\frac{\pi}{6}$

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

$2x-\frac{\pi}{9}=2k\pi-\frac{\pi}{2}-2x \longrightarrow x=\frac{k\pi}{2}-\frac{7\pi}{72}$ ✓

۵- $\frac{\sin 4x+\sin 2x}{\sin 2x}-\sin^2 x=\frac{\cos^2 x}{1-\sin^2 x}$ $\quad \frac{\sin 4x+\sin 2x}{\sin 2x}=1$ ۲

$\sin 2x\neq 0$ $\quad x\neq \frac{k\pi}{2}$ $\quad \frac{k\pi}{2}$

$\sin 2x=\sin 4x+\sin 2x$ $\quad \sin 4x=0$ $\quad 4x=k\pi$ $\quad x=\frac{k\pi}{4}$

$x=k\pi\pm\frac{\pi}{4}$ ✓

$k=0\to x=\pi$ $\quad k=-1\to x=-\pi$ $\quad |\pi-(-\pi)|=2\pi$ $\quad$ (1,5)

۶- $\frac{\sin\frac{x}{2}}{1+\cos\frac{x}{2}}=\frac{1+\cos\frac{x}{2}}{\sin\frac{x}{2}}$ $\quad \tan\frac{x}{4}=\cot\frac{x}{4}$ $\quad \tan\frac{x}{4}=\tan\left(\frac{\pi}{2}-\frac{x}{4}\right)$ $\quad \frac{x}{4}=k\pi+\frac{\pi}{2}-\frac{x}{4}$

$x=2k\pi+\pi$ (I) $\quad \cos\frac{x}{2}\neq 1$ $\quad \frac{x}{2}\neq 2k\pi+\pi$ $\quad x\neq 4k\pi+2\pi$ (II) $\quad \sin\frac{x}{2}\neq 0$

$\frac{x}{2}\neq k\pi$ $\quad x\neq 2k\pi$ (III) $\quad \cap \longrightarrow$ $\cancel{x=2k\pi+\pi}$

اختلاف جواب ها؟

۷- $\cos^2 x-\sin^2 x\cos 3x=\cos^2 x+\sin^2 x$

$\cos^2 x-\sin^2 x\cos 3x-\cos^2 x-\sin^2 x=-\sin^2 x\cos 3x-\sin^2 x=0$

$-\sin^2 x(\cos 3x+1)=0$ $\quad -\sin^2 x=0$ $\quad \sin x=0$ $\quad x=k\pi$ ۲

$\cos 3x=-1$ $\quad 3x=2k\pi+\pi$ $\quad x=\frac{2k\pi}{3}+\frac{\pi}{3}$

$x=0 \quad \pi \quad 2\pi \quad \frac{\pi}{3} \quad \cancel{\frac{\pi}{3}} \quad \frac{5\pi}{3}$

۵ جواب ✓

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۸- $\tan(\frac{\pi}{4}-x)=\tan 3x \quad 3x=k\pi+\frac{\pi}{4}-x$

$x=\frac{k\pi}{4}+\frac{\pi}{16}$ I $\quad \tan x\neq -1 \quad x\neq k\pi-\frac{\pi}{4}$ ۲

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

۹

$\sqrt{2}\cos 2x\geq 0 \quad \cos 2x\geq 0 \quad x\in[0,\ ] \quad 2x\in[0,2\pi]$

$2x\in[0,\frac{\pi}{2})\cup[\frac{3\pi}{2},2\pi] \quad x=[0,\frac{\pi}{4}]\cup[\frac{3\pi}{4},\pi)$

$1+\sin 2x=2\cos^2 2x \quad 1+\sin 2x=1+\cos 4x$

$\sin 2x=\cos 4x \quad \sin 2x=\sin(\frac{\pi}{2}-4x)$ ۲ گزینه

$2x=\frac{\pi}{2}-4x+2k\pi \quad 6x=\frac{\pi}{2}+2k\pi \quad x=\frac{\pi}{12}+\frac{k\pi}{3} \rightarrow \frac{\pi}{12} \quad \frac{5\pi}{12} \quad \frac{3\pi}{4}$

$x=-\frac{\pi}{4}-k\pi$ در بازه نیست — در بازه ابتدای سوال نیست ← دو جواب

۱۰

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

$(\underbrace{\sin x-\cos x}_{t})(1+\underbrace{\sin x\cos x}_{\frac{1-t^2}{2}})=-1 \qquad t^3-3t-2=0$

$\sin-\cos=t \quad (\sin-\cos)^2=t^2=\sin^2+\cos^2-2\sin\cos$

$\sin\cos=\frac{1-t^2}{2}$ ۳

$t=-1 \quad \sin x-\cos=-1$

$0-\cos x=-1 \quad \cos x=1 \quad x=2k\pi \leftarrow \sin x=0$ اگر

$\sin x=-1 \quad \sin x=-1 \quad x=\frac{3\pi}{2}+2k\pi \leftarrow \cos x=0$ اگر

جواب ها $\frac{3\pi}{2}$ و 2π و 0 ← دارای سه جواب

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

$\cos 2x=-1 \quad 2x=2k\pi+\pi \quad x=k\pi+\frac{\pi}{2}$