۷ هدلیا ابوطالبی

۱- الف) $\cos 2x = 1 - 2\sin^2 x \Rightarrow \quad 1 - 2\sin^2 x = 3\sin x - 1$

$$+2\sin^2 x + 3\sin x - 2 = 0$$
$$\sin^2 x + 3\sin x - 4 = 0$$
$$(\sin x + 4)(\sin x - 1) = 0$$
$$\frac{-4}{2} = -2 \qquad \frac{1}{2} \Rightarrow$$

$$\sin x = \frac{1}{2} \quad \frac{\pi}{6}$$
$$x = 2k\pi + \frac{\pi}{6}$$
$$x = 2k\pi + \pi - \frac{\pi}{6}$$

۱ ب) $2\cos^2 x - 1 + \cos x - 2 = 0$

$$2\cos^2 x + \cos x - 3 = 0$$
$$\cos^2 x + \cos x - 6 = 0$$
$$(\cos x + 3)(\cos x - 2)$$
$$\frac{-3}{2} \qquad \frac{2}{2} = 1$$

$$\cos x = 1$$
$$2k\pi$$

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

$$(\sin^2 x - \cos^2 x)\cancel{(\sin^2 x + \cos^2 x)} = \cancel{\sin 4x}$$
$$1 \qquad 2\sin 2x \cos 2x$$
$$-\cos 2x = 2\sin 2x\,\cancel{\cos 2x} \Rightarrow \sin 2x = -\frac{1}{2}$$
$$2x = 2k\pi + \frac{7\pi}{6} \quad x = k\pi + \frac{7\pi}{12}$$
$$2x = 2k\pi - \frac{\pi}{6} \Rightarrow x = k\pi - \frac{\pi}{12}$$

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

$$\sin\left(\frac{\pi}{2} - 2x\right) = \sin(-2x)$$
$$\frac{\pi}{2} - 2x = 2k\pi + 2x \Rightarrow \quad \cancel{\frac{\pi}{2} - 2k\pi} = 4x$$
$$\frac{\pi}{2} - 2x = 2k\pi + \pi - 2x \rightarrow \text{ج نداره} \qquad \left(\frac{k\pi}{2} + \frac{\pi}{8}\right) \qquad 2k\pi + \frac{3\pi}{2} \Rightarrow$$

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

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

$\cos x=0 = k\pi+\pi$

$\cos x=\frac{-1}{2} \Rightarrow 2k\pi \pm \frac{2\pi}{3}$ ۱

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

$\underline{=2 \;\; 2\sin^2 x - \sin x\cos x+\cos^2 x}$

$-2\cos^2 x = \;\; -\cos^2 x - \sin x.\cos x$ ۱

$-\cos x(1+\sin x)=0$

$k\pi+\frac{\pi}{2}$

$2k\pi+\pi$

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

$\sin(x+\frac{\pi}{4})$

$\cancel{\frac{1}{2}}\sin(\frac{\pi}{2}+2x)=\cancel{\frac{1}{4}}\frac{1}{2} \Rightarrow \frac{\pi}{2}+2x=2k\pi\pm\frac{\pi}{6}$

$\frac{\pi}{6}$ $\quad 2x=2k\pi+\cancel{\frac{\pi}{6}-\frac{\pi}{2}}$ ۱

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

$\cancel{\frac{\pi}{2}}$

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

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

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

Cos

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

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

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

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

$2 - 9$

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

$-\frac{7\pi}{36} - \frac{k\pi}{2} = x$

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$\frac{\sin^2 x\,(2\cos 2x + 1)}{\cancel{\sin^2 x}} \Rightarrow 2\cos 2x + 1 = \underbrace{\cancel{\sin^2 x + \cos^2 x}}_{1}$

$2\cos 2x = 0$

$\cos 2x = 0 \ldots \Rightarrow$

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

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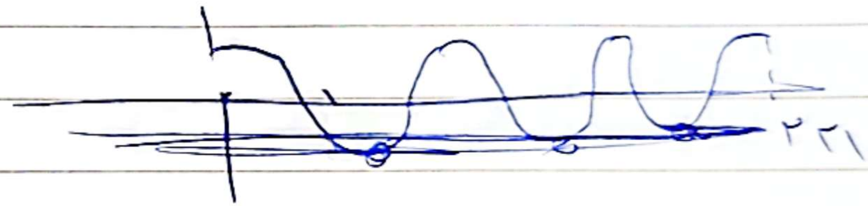
$\cos^2 x - 1 - \sin^2 x \cos^3 x = 0$

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

$-\underline{\sin^2 x}\,(1 + \underline{\cos^3 x}) = 0 \Rightarrow$

$k\pi$ → ۳ جواب

$\cos^3 x = -1$ → ۳ جواب $\Rightarrow$



۴ جواب دارد

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$1 + \sin ۲x = ۲\cos^۲ ۲x \Rightarrow \sin ۲x = ۲\cos^۲ ۲x - 1$

$\sin ۲x = \cancel{۲\cos^۲ ۲x - 1}$

$\rightarrow \sin^۲ ۲x + \cos^۲ ۲x$

$\cancel{\sin ۲x} = \cos ۴x \Rightarrow$

$\cos(\frac{\pi}{۲} - ۲x) \Rightarrow$

$۴x = ۲k\pi + \frac{\pi}{۲} - ۲x$

$۴x = ۲k\pi - \frac{\pi}{۲} + ۲x$

$۶x = ۲k\pi + \frac{\pi}{۲}$

$\frac{۲k\pi + \pi}{۶}$

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

$x = k\pi - \frac{\pi}{۴}$

۱۵ـ

الف) $(\cancel{\sin^2 x + \cos^2 x})(\sin^2 x - \cos^2 x) = 1 \Rightarrow$

$\underbrace{}_{1}$

$-\cos 2x = 1 \Rightarrow$

$\cos 2x = -1 \Rightarrow 2k\pi + \pi = 2x$

$\boxed{k\pi + \frac{\pi}{2}}$

ب) $\sin^4 x - \cos^2 x = -1$: تمام نقاط مرزی را در بازه بررسی قرار می‌دهیم

2π و $\frac{3\pi}{2}$ در $\Rightarrow 2k\pi \cup 2k\pi - \frac{\pi}{2}$

صدق می‌کند