نام و نام خانوادگی طاها حق‌جویی ...... پاسخنامه تشریحی تکلیف شماره ۱۶ کلاس دوازدهم پسر A ......

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الف) $1-2\sin^2 x = 3\sin x - 1 \to 2\sin^2 x - 3\sin x - 2 = 0 \to \sin x = -\frac{3}{2}\ \times,\ \frac{1}{2}\ \checkmark$

$\to \sin x = \sin\frac{\pi}{6} \to \begin{cases} x = 2k\pi + \frac{\pi}{6} \\ x = 2k\pi + \pi - \frac{\pi}{6} = 2k\pi + \frac{5\pi}{6} \end{cases}$

ب) $2\cos^2 x - 1 + \cos x - 2 = 0 \to 2\cos^2 x + \cos x - 3 = 0 \to \cos x = -\frac{3}{2}\ \times,\ 1\ \checkmark$

$x = 2k\pi$

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

$\Longrightarrow \begin{cases} 2x = 2k\pi + \frac{7\pi}{6} \to x = k\pi + \frac{7\pi}{12} \\ 2x = 2k\pi + \pi - \frac{7\pi}{6} \to x = k\pi - \frac{\pi}{12} \end{cases}$

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

$\to \tan 2x + 1 = 0 \to \tan 2x = -1 = \tan -\frac{\pi}{4} \to 2x = k\pi - \frac{\pi}{4} \to x = \frac{k\pi}{2} - \frac{\pi}{8}$

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الف) $\frac{2\cos^2 x + \cos x - 1}{\sin x} = 0 \xrightarrow[\sin x \neq 0]{} \text{صورت} = 0 \to \cos x = -1\ \times\ \sin \neq 0,\ \frac{1}{2}\ \checkmark$

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

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

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

$\to x = k\pi - \frac{\pi}{4}$

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

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

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

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

$= 5\cos^2 x - 2 = \cos^2 x \to 4\cos^2 x = 2 \to 2\cos^2 x - 1 = 0 \to \cos 2x = 0 = \cos\frac{\pi}{2}$

$2x = 2k\pi \pm \frac{\pi}{2} \to x = k\pi \pm \frac{\pi}{4}$

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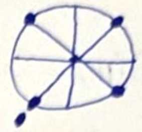
$$\frac{\cancel{2}\sin\frac{x}{4}\cancel{\cos\frac{x}{4}}}{\cancel{2}\cos^{2}\frac{x}{4}} = \tan\frac{x}{4} = \frac{1+\cos\frac{x}{2}}{\sin\frac{x}{2}} = \frac{\cancel{2}\cos^{\cancel{2}}\frac{x}{4}}{\cancel{2}\sin\frac{x}{4}\cancel{\cos\frac{x}{4}}} = \cot\frac{x}{4} = \frac{1}{\tan\frac{x}{4}}$$

$$\Rightarrow \tan\frac{x}{4} = \frac{1}{\tan\frac{x}{4}} \Rightarrow \tan^{2}\frac{x}{4} = 1 \to \tan\frac{x}{4} = \pm 1 \Rightarrow \begin{cases} \frac{x}{4} = k\pi + \frac{\pi}{4} \\ \frac{x}{4} = k\pi + \frac{3\pi}{4} \end{cases}$$



$$\left|\frac{\pi}{4} - \frac{3\pi}{4} - \frac{5\pi}{4} - \frac{5\pi}{4} - \frac{7\pi}{4}\right| = \frac{19\pi}{4}$$

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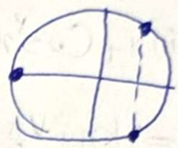
$$\cos^{2}x - 1 = \cancel{\sin^{2}x}\cos 3x = -\cancel{\sin^{2}x} \Rightarrow \cos 3x = -1 = \cos\pi$$

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



۳ جواب

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

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

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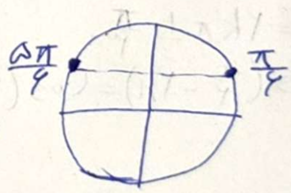
$$1 + \sin 2x = 2\cos^{2}2x = 1 + \cos 4x \to \sin 2x = \cos 4x = 1 - 2\sin^{2}2x$$

$$\to 2\sin^{2}2x + \sin 2x - 1 = 0 \to \sin x = \begin{cases} -1 = \sin\frac{3\pi}{2} \\ \frac{1}{2} = \sin\frac{\pi}{6} \end{cases}$$

$$\begin{cases} x = 2k\pi + \frac{3\pi}{2} \\ x = 2k\pi - \frac{3\pi}{2} + \pi \\ x = 2k\pi + \frac{\pi}{6} \\ x = 2k\pi + \pi - \frac{\pi}{6} \end{cases}$$



۲ جواب

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

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

ب) $\underbrace{(\sin x - \cos x)}_{\sqrt{2}\sin(x-\frac{\pi}{4})}(\underbrace{\cancel{\sin^{2}x + \cos^{2}x}}_{1} + \underbrace{\sin x\cos x}_{\frac{1}{2}\sin 2x})$