نام و نام خانوادگی: کوروش شیرانی فر ...... پاسخنامه تشریحی تکلیف شماره ۱۶ ...... کلاس دوازدهم تجربی A

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الف) $\cos 2x = 3\sin x - 1$

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

$\Rightarrow \sin x = -\frac{4}{2}$ ✗ $\quad \sin x = \frac{1}{2}$ ✓

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

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

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

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

$\Rightarrow \cos^2 x + \cos x - 6 = 0 \Rightarrow \cos x = \frac{-3}{2}$ ✗

$\cos x = \frac{2}{2} = 1$ ✓

$\Rightarrow x = 2k\pi$

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الف) $\cos^4 x - \sin^4 x = -\sin 4x$

$\Rightarrow \cos 2x = -\sin 4x \Rightarrow \cos 2x = -2\sin 2x \cdot \cos 2x$

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

$\sin 2x = -\frac{1}{2} \Rightarrow 2x = 2k\pi - \frac{\pi}{6} \Rightarrow x = k\pi - \frac{\pi}{12}$

و $2x = 2k\pi + \frac{7\pi}{6} \Rightarrow x = k\pi + \frac{7\pi}{12}$

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

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

$\Rightarrow \cos 2x = -\sin 2x$

$\Rightarrow 2x = k\pi + \frac{3\pi}{4} \Rightarrow x = \frac{k\pi}{2} + \frac{3\pi}{8}$

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

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

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

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

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

$\cos x = -1 \Rightarrow x = 2k\pi + \pi$ ✗ چون $\sin x = 0$

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

$\cos x + \sin x = 0$

$1 + \tan x = 0$

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

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

$\Rightarrow -\sin(x - \frac{\pi}{4}) \cdot \cos(x - \frac{\pi}{4}) = \frac{1}{4}$

$\Rightarrow -\frac{1}{2}\sin(2x - \frac{\pi}{2}) = \frac{1}{4}$

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

$\Rightarrow x = k\pi + \frac{\pi}{6}$ و $2x - \frac{\pi}{2} = 2k\pi + \frac{7\pi}{6} \Rightarrow x = k\pi + \frac{5\pi}{6}$

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

$\Rightarrow \sin(-2x + \frac{11\pi}{18}) = \sin -2x$

$\Rightarrow -2x + \frac{11\pi}{18} = 2k\pi - 2x \rightarrow$ ✗

و $-2x + \frac{11\pi}{18} = 2k\pi + \pi + 2x$

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

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

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

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$\frac{\sin 4x + \sin 2x}{\sin 2x} - \sin^2 x = \cos^2 x \Rightarrow \frac{\sin 4x}{\sin 2x} + 1 = 1 \Rightarrow \frac{\sin 4x}{\sin 2x} = 0$

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

K	0	1	2	3	4	5	6	7	8
x	0 ✗	$\frac{\pi}{4}$ ✓	$\frac{\pi}{2}$ ✗	$\frac{3\pi}{4}$ ✓	π ✗	$\frac{5\pi}{4}$ ✓	$\frac{6\pi}{4}$ ✗	$\frac{7\pi}{4}$ ✓	2π ✗

آن‌هایی که X دارند یعنی $\sin 2x$ را صفر می‌کنند

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

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$k=0 \rightarrow x=\pi \qquad k=-1 \rightarrow x=-\pi \qquad |-\pi-\pi| = 2\pi$

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$\sin x = 0 \rightarrow x = 0, \pi, 2\pi$

$\cos 2x = -1 \rightarrow x = \frac{\pi}{2}, \pi, \frac{3\pi}{2}$

0 ۷

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

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

$\tan\left(\frac{\pi}{4} - x\right) = \tan 2x \rightarrow \frac{\pi}{4} - x = k\pi + 2x \rightarrow x = \frac{k\pi}{3} + \frac{\pi}{12}$

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$\sin 2x = -1 \rightarrow 2x = k\pi - \frac{\pi}{2} \rightarrow \frac{3\pi}{2}$

$2x = k\pi + \frac{\pi}{12} \rightarrow \frac{\pi}{12}$

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ب) $\sin^4 x - \cos^4 x = 0$

$0 \rightsquigarrow 0 - 1 = -1$ ✗

$\frac{\pi}{2} \rightsquigarrow 1 - 0 = 1$ ✓

$\pi \rightsquigarrow 0 - 1 = -1$ ✗

$\frac{3\pi}{2} \rightsquigarrow 1 - 0 = 1$ ✓

$2\pi \rightsquigarrow 0 - 1 = -1$ ✗

ج) $\sin^3 x - \cos^3 x = -1$

$0 \rightsquigarrow 0 - (+1) = -1$ ✓

$\frac{\pi}{2} \rightsquigarrow 1 - 0 = +1$ ✗

$\pi \rightsquigarrow 0 - (-1) = +1$ ✗

$\frac{3\pi}{2} \rightsquigarrow -1 + 0 = -1$ ✓

$2\pi \rightsquigarrow 0 - (+1) = -1$ ✓

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

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