نام و نام خانوادگی ......آرین کبیری...... پاسخنامه تشریحی تکلیف شماره ...16... کلاس ....

1

الف) $\cos 2x = (1-\sin^2 x) - \sin^2 x = 3\sin x - 1 \rightarrow 2\sin^2 x + 3\sin x - 2 = 0$

$\sin x = -2$ (غ ق ق) یا $\frac{1}{2} \rightarrow \sin x = \sin\frac{\pi}{6} \rightarrow$ $x = 2k\pi + \frac{\pi}{6}$ ، $2k\pi + \frac{5\pi}{6}$

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

$2\cos^2 x + \cos x - 3 = 0 \rightarrow \cos x = -\frac{3}{2}$ (غیرقابل قبول) یا $1 \rightarrow \cos x = \cos\frac{\pi}{2}$

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

2

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

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

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

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

$\cos 2x = \cos(\frac{\pi}{2} + 2x) \rightarrow 4x = 2k\pi - \frac{\pi}{2} \rightarrow \frac{k\pi}{2} - \frac{\pi}{8}$

3

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

($\cos 2x + c$)

$\leftarrow \cos(\pi - x)$

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

$x = 2k\pi - \pi$

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

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

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

4

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

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

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

$\downarrow$ $\cos(\frac{\pi}{2} + 2x)$

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

$\hookrightarrow 2k\pi - \frac{7\pi}{18} = 4x \rightarrow x = \frac{k\pi}{2} - \frac{7\pi}{72}$

5

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

$\cos 2x = 0 \rightarrow$ ~~$2x = 2k\pi \rightarrow x = k\pi$~~ $\rightarrow \cos 2x = \cos\frac{\pi}{2}$

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

$\sin 2x \neq 0 \longrightarrow$ هیچ وقت به ازای جواب‌ها صفر نمی‌شود

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

$\frac{\sin\frac{x}{2}}{1+\cos\frac{x}{2}} = \frac{1+\cos\frac{x}{2}}{\sin\frac{x}{2}} \to (1+\cos\frac{x}{2})^2 = \sin^2\frac{x}{2} \to \cos^2\frac{x}{2}+\cos\frac{x}{2}=0$ ۶

$\sin\frac{x}{2}\neq 0$

$\cos\frac{x}{2}(\cos\frac{x}{2}+1)=0$

① $\frac{x}{2}=2k\pi\pm\frac{\pi}{2} \to x=4k\pi\pm\pi$

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

$x=-\pi,\pi \to \pi-(-\pi)=\boxed{2\pi}$

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

$\sin^2x\cos 3x = 1-\cos^2x \to \sin^2x(1+\cos 3x)=0 \to \sin x=\sin 0$ ۷

$x=2k\pi$, $x=2k\pi+\pi$ } $x=k\pi$

$\cos 3x=\cos\pi \to 3x=2k\pi+\pi \to x=(\frac{2k+1}{3})\pi$

$k\pi$:

$0, \pi, 2\pi$

$(\frac{2k+1}{3})\pi$:

$\frac{\pi}{3}, \pi, \frac{5\pi}{3}$ } ۵ جواب

$\frac{\cos x-\sin x}{\cos x+\sin x} = \frac{\sin 3x}{\cos 3x} \to \cos 3x\cos x-\sin 3x\sin x = \sin 3x\cos x+\cos 3x\sin x$ ۸

$\cos 4x=\sin 4x$

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

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

$\sqrt{1+\sin 2x} = \sin x+\cos x \to \sin x+\cos x = \sqrt{2}\sin(\frac{\pi}{4}+x) = \sqrt{2}\cos 2x$ ۹

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

$2k\pi-\frac{3\pi}{4}=3x \to \frac{2k\pi}{3}-\frac{\pi}{4}=x \to x=\frac{5\pi}{12}$

$x=\frac{3\pi}{4}, \frac{5\pi}{12} \to$ دو جواب

الف) $-\cos 2x=\cos 0 \to \cos(\pi-2x)=\cos 0 \to 2k\pi=\pi-2x \to x=k\pi+\frac{\pi}{2}$ ۱۰

ما $\frac{\pi}{2}, \frac{3\pi}{2} \to$ ۲ جواب

ب) $\sin^3x-\cos^3x=-1 \to \sin x=-1, \cos x=0$ یا $\cos x=1, \sin x=0$

$0, \frac{3\pi}{2}, 2\pi \to$ ۳ جواب