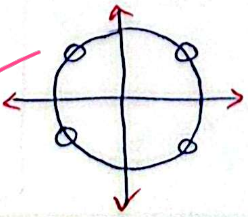
۱۹٫۷۵ آفرین خیلی خوب نوشتی :)

نام و نام خانوادگی ......مریم معصومی......   پاسخنامه تشریحی تکلیف شماره ..۱۶... کلاس ..یازدهم ریاضی.........

۱	ب) $\underbrace{\cos 2x} + \cos x - 2 = 0$ $2\cos^2 x + \cos x - 3 = 0 \rightarrow$ جمع ضرایب صفر $\cos x = 1$ $\quad \cos x = -\frac{3}{2} \rightarrow$ غ ق ق $\downarrow \overbrace{\quad}^{\cos 0}$ $\cos x = \cos 0 \rightarrow x = 2k\pi \pm 0$ $\{x = 2k\pi, k \in \mathbb{Z}\}$ ✓ ②	الف) $\underbrace{\cos 2x}_{1-2\sin^2 x} = 3\sin x - 1$ $2\sin^2 x + 3\sin x - 2 = 0 \rightarrow \sin^2 x + 3\sin x - 4 = 0$ $\sin x = -2 \rightarrow$ غ ق ق $\quad \sin x = \frac{1}{2}$ ق ق $\sin x = \sin\frac{\pi}{6}$ $\boxed{x = 2k\pi + \frac{\pi}{6}}$ ✓ $\boxed{x = 2k\pi + \underbrace{\frac{5\pi}{6}}_{\pi - \frac{\pi}{6}}}$ ✓ $k \in \mathbb{Z}$
۲	ب) $2\cos^2 x + 2\sin x\cos x = 1$ $\underbrace{2\cos^2 x - 1}_{\cos 2x} + \sin 2x = 0 \rightarrow \sin 2x = -\cos 2x$ $\xrightarrow[\cos 2x]{\div \text{دوطرف}}$ $\tan 2x = -1 \rightarrow 2x = k\pi - \frac{\pi}{4}$ ② ✓ $\boxed{x = \frac{k\pi}{2} - \frac{\pi}{8}}$ $k \in \mathbb{Z}$	الف) $\sin^4 x - \cos^4 x = \sin 4x$ $\underbrace{(\sin^2 x - \cos^2 x)}_{-\cos 2x}\underbrace{(\sin^2 x + \cos^2 x)}_{1} = \sin 4x$ $-\cancel{\cos 2x} = 2\sin 2x\cancel{\cos 2x}$ ① $\cos 2x = 0$ $\sin 2x = -\frac{1}{2} \Rightarrow \sin 2x = \sin(-\frac{\pi}{6})$ $2x = 2k\pi \pm \frac{\pi}{2}$ $\boxed{x = k\pi \pm \frac{\pi}{4}}$ ✓ ② $\{$ $2x = 2k\pi - \frac{\pi}{6} \rightarrow \boxed{x = k\pi - \frac{\pi}{12}}$ ✓ $2x = 2k\pi + \pi + \frac{\pi}{6}$ $\boxed{x = k\pi + \frac{7\pi}{12}}$ ✓
۳	ب) $2\sin^2 x - \sin x\cos x + \cos^2 x = 2$ $\cancel{\sin^2 x} + \underbrace{\sin^2 x + \cos^2 x}_{\cancel{1}} - \sin x\cos x = \cancel{1} + \cancel{\sin^2 x} + \cos^2 x$ $-\sin x\cancel{\cos x} = \cos^{\cancel{2}} x \xrightarrow{\div\cos x} -\sin x = \cos x$ $\div \sin x \downarrow$ $\cos x = 0 \rightarrow \boxed{x = k\pi + \frac{\pi}{2}}$ ✓ $\quad \cot x = -1$ ۱٫۷۵ $\boxed{x = k\pi - \frac{\pi}{4}}$ ✓	الف) $\underset{\frac{\cos x}{\sin x}}{\cancel{\cot x}}(2\cos x + 1) = \frac{1}{\cancel{\sin x}} \rightarrow \sin x \neq 0$ $\cos x(2\cos x + 1) = 1$ $\quad 2\cos^2 x + \cos x - 1 = 0$ $\cos x = -1$ یا $\cos x = \frac{1}{2} \rightarrow \cos x = \cos\frac{\pi}{3}$ یا $\boxed{x = 2k\pi \pm \frac{\pi}{3}}$ ✓ ① $\cos x = \cos\pi$ $\boxed{x = 2k\pi \pm \pi = \pi(2k \pm 1)}$ ② ✗ اگر $\cos x = -1$ باشد، $\sin x = 0$ است و عبارت تعریف نشده می‌شود پس جواب غیر قابل قبول محسوب می‌شود
۴	ب) $\cos(2x - \frac{\pi}{9}) = -\sin 2x \hookrightarrow \cos(\frac{\pi}{2} + 2x)$ $\cos(2x - \frac{\pi}{9}) = \cos(\frac{\pi}{2} + 2x)$ $\quad$ غ ق ق 1) $\cancel{2x} - \frac{\pi}{9} = 2k\pi + \cancel{2x} + \frac{\pi}{2} \rightarrow \underbrace{2k\pi + \frac{\pi}{2} = -\frac{\pi}{9}}$ جواب ندارد. 2) $2x - \frac{\pi}{9} = 2k\pi - (\frac{\pi}{2} + 2x)$ $4x = 2k\pi + \frac{\pi}{9} - \frac{\pi}{2} \rightarrow 4x = 2k\pi - \frac{7\pi}{18}$ ② $\boxed{x = -\frac{7\pi}{72} + \frac{k\pi}{2} \quad k \in \mathbb{Z}}$ ✓	الف) $\cos(\frac{\pi}{4} + x)\cos(-x + \frac{\pi}{4}) = \frac{1}{4}$ $\cos x = \cos(-x)$ $\frac{\pi}{4} + x - x + \frac{\pi}{4} = \frac{\pi}{2}$ ⋆ $\xrightarrow{⋆} \underline{\cos(\frac{\pi}{4} + x)\,\sin(\frac{\pi}{4} + x)} = \frac{1}{4}$ جمع دو زاویه ۹۰ پس $\sin\alpha = \cos\beta$ ⋆ $\alpha + \beta = 90$ $\frac{1}{\cancel{2}}\sin(2x + \frac{\pi}{2}) = \frac{1}{\cancel{4}\,2}$ $\cos 2x = \frac{1}{2} \rightarrow 2x = 2k\pi \pm \frac{\pi}{3} \rightarrow \boxed{x = k\pi \pm \frac{\pi}{6}}$ ✓
۵	$\frac{\sin 4x + \sin 2x}{\sin 2x} = \underbrace{\sin^2 x + \cos^2 x}_{1}$ $\quad \sin 4x = 2\sin 2x\cos 2x$ $\frac{2\sin 2x\cos 2x + \sin 2x}{\sin 2x} = 1 \rightarrow 2\cos 2x + 1 = 1 \rightarrow \cos 2x = 0 \rightarrow \cos 2x = \cos\frac{\pi}{2}$ $2x = 2k\pi \pm \frac{\pi}{2} \rightarrow \boxed{x = k\pi \pm \frac{\pi}{4}}$ ✓  $\{\frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{4}, \dots\}$ ②	

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می‌دانیم $\tan\frac{\alpha}{2}=\frac{1-\cos\alpha}{\sin\alpha}=\frac{\sin\alpha}{1+\cos\alpha}$ ①

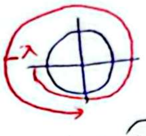
$$\underbrace{\frac{\sin\frac{x}{2}}{1+\cos\frac{x}{2}}}=\frac{1+\cos\frac{x}{2}}{\underbrace{\sin\frac{x}{2}}}\qquad\frac{1}{\left(\underbrace{\frac{\sin\frac{x}{2}}{1+\cos\frac{x}{2}}}_{\tan\frac{x}{4}}\right)}=\cot\frac{x}{4}$$

$\xrightarrow{*}\tan\frac{x}{4}=\cot\frac{x}{4}$

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

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

$[-\pi,\frac{3\pi}{2}]$



جواب‌ها

$\pi(2k+1)$ → ضرایب فرد π

$x=\pi,3\pi,5\pi$

$-\pi$ و -3π و -5π

π و $-\pi$ جواب‌ها به طور کلی | $|\pi-(-\pi)|=\boxed{2\pi}$ ✓

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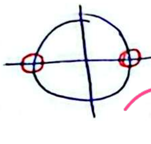
$\cos^2x-\sin^2x\cos 3x=1\rightarrow\sin^2x=0\rightarrow\sin x=0\rightarrow\boxed{x=k\pi}$

$\underbrace{1-\cos^2x}_{\cancel{\sin^2x}}=-\cancel{\sin^2x}\cos 3x\rightarrow\cos 3x=-1\rightarrow\cos 3x=\cos\pi$

$\boxed{x=0,\pi,2\pi}$ ①



$3x=2k\pi\pm\pi\rightarrow x=\underbrace{\frac{2k\pi}{3}\pm\frac{\pi}{3}}_{\frac{(2k+1)\pi}{3}}\xrightarrow[\text{به k عدد می‌دهیم } k\in Z]{\text{جواب ها}}$

$*\{0,\frac{\pi}{3},\pi,\frac{5\pi}{3},2\pi\}$ ✓

۵ جواب دارد.

$k=0\rightarrow\frac{\pi}{3}\quad k=1\rightarrow\pi\quad k=2\rightarrow x=\frac{5\pi}{3}$

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$$\underbrace{\frac{1-\tan x}{1+\tan x}}=\tan 3x$$

$$\frac{\cos x-\sin x}{\cos x+\sin x}=\frac{\sqrt{2}\sin(-x+\frac{\pi}{4})}{\underbrace{\sqrt{2}\sin(x+\frac{\pi}{4})}_{\cos(\frac{\pi}{4}-x)}}=\tan(\frac{\pi}{4}-x)=\tan 3x$$

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

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

$4x=k\pi+\frac{\pi}{4}$ ✓

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

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$$\underbrace{\sqrt{1+\sin 2x}}=\sqrt{2}\cos 2x$$

$\sqrt{(\sin x+\cos x)^2}$

$|\sin x+\cos x|=\sqrt{2}\cos 2x$

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

$\cos(\frac{\pi}{4}-x)=\cos 2x\qquad k=0\ x=\frac{\pi}{12}\ /\ k=1\ x=\frac{9\pi}{12}=\frac{3\pi}{4}$

$2x=2k\pi\pm(\frac{\pi}{4}-x)\qquad x=\frac{2k\pi}{3}+\frac{\pi}{12}$

① $2x=2k\pi+\frac{\pi}{4}-x\rightarrow 3x=2k\pi+\frac{\pi}{4}$

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

۲ ✓

دو جواب در بازه $[0,\pi]$ ⇐ راه دوم سوال در پایان پی دی اف

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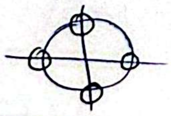
الف) $\sin^4x-\cos^4x=1\rightarrow\cos 2x=-1$

$\cos 2x=\cos\pi\rightarrow 2x=2k\pi\pm\pi$

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



۴ جواب دارد.

$\{\frac{\pi}{2},\pi,\frac{3\pi}{2},2\pi\}$ ✓

ب) $\sin^3x-\cos^3x=-1$

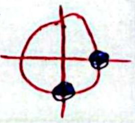
۴ نقطه اصلی را امتحان می‌کنیم

1) $\sin x=0\quad\cos x=1$ ✓

2) $\sin x=1\quad\cos x=0$ ✗

3) $\sin x=0\quad\cos x=-1$ ✗

4) $\sin x=-1\quad\cos x=0$ ✓



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

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راه دوم سوال ۹

$\sqrt{1+\sin 2x} = \sqrt{2}\cos 2x$ $\quad$ $\sin^2 2x + \cos^2 2x = 1$

همواره ⊕ $\quad$ باید مثبت باشد

$\xrightarrow{\text{به توان ۲}} 1+\sin 2x = \underbrace{2\cos^2 2x}_{2(1-\sin^2 2x)}$ ✓

$\rightarrow 2\sin^2 2x + \sin 2x - 1 = 0 \quad < \begin{matrix} \sin 2x = \frac{1}{2} \\ \sin 2x = -1 \end{matrix}$

$\sin 2x = \frac{1}{2} \rightarrow 2x = 2k\pi + \frac{\pi}{6} \rightarrow x = k\pi + \frac{\pi}{12}$ ▲

$\sin 2x = -1 \rightarrow 2x = 2k\pi + \frac{3\pi}{2} \rightarrow x = k\pi + \frac{3\pi}{4}$ ✓ ▲

$\sqrt{2}\cos 2x \geq 0 \rightarrow \cos 2x \geq 0$.

① $x = \frac{\pi}{12}$ و $x = \frac{3\pi}{4}$ $\rightarrow$ ۲جواب دارد. ✓ دربازه $[0,\pi]$