(۱ هستی توانی دوازدهم دسته A

ب)

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

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

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

$\begin{cases} \cos x = 1 \\ \cos x = -\frac{3}{2} \times \end{cases}$ $\boxed{x = 2k\pi}$

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الف) ①

$\cos 2\alpha = 3\sin\alpha - 1$

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

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

$\sin x = \frac{-3 \pm \sqrt{9+16}}{4} = \begin{cases} \sin x = \frac{1}{2} \\ \sin x = \sin\frac{\pi}{6} \\ \sin x = 2 \times \end{cases}$

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

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

۱۸٫۵

ب) ②

$2\cos^2 x + 2\sin x\cos x = 1$

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

$\sin 2x = -\cos 2x = \cos(\pi - 2x)$

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

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

$\boxed{x = -\frac{k\pi}{2} + \frac{3\pi}{8}}$

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الف) ②

$\sin^4 x - \cos^4 x = \sin 4x$

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

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

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

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

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

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

ب) ③

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

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

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

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

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

$\cos x = 0$ ، $\boxed{\sin x = \cos x}$

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

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الف) ③

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

$\frac{\cos x}{\cancel{\sin x}}(2\cos x + 1) = \frac{1}{\cancel{\sin x}}$ $\boxed{\sin x \neq 0}$

$2\cos^2 x + \cos x - 1 = 0$ $\begin{cases} \cos x = -1 \times \\ \cos x = \frac{1}{2} \end{cases}$

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

ب) ④

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

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

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

$-4x = 2k\pi + \frac{7\pi}{18}$

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

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الف) ④

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

$\cos(\frac{\pi}{4} + x)\sin(\frac{\pi}{4} + x) = \frac{1}{4}$

$\cancel{\frac{1}{2}}\sin(\frac{\pi}{2} + 2x) = \cancel{\frac{1}{2}}\cdot\frac{1}{2}$

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

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

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

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

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

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۵) $\frac{\sin 4x+\sin 2x}{\sin 2x}-\sin^2x=\cos^2x$ ۱٫۵

$\frac{\sin 4x+\sin 2x}{\sin 2x}=1\to \sin 4x+\sin 2x=\sin 2x$

$\sin 4x=0$ $\boxed{x=k\pi}$

۶) $\frac{\sin\frac{x}{2}}{1+\cos\frac{x}{2}}=\frac{1}{\sin\frac{x}{2}}+\frac{\cos\frac{x}{2}}{\sin\frac{x}{2}}$ ۲

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

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

$\cancel{1}-\cos^2\frac{x}{2}=\cancel{1}+\cos^2\frac{x}{2}+2\cos\frac{x}{2}$

$2\cos^2\frac{x}{2}+2\cos\frac{x}{2}=0$

$2\cos\frac{x}{2}(\cos\frac{x}{2}+1)=0$; $\downarrow 0$; $\to -1$

$\frac{x}{2}=2k\pi\pm\frac{\pi}{2}$ $\qquad$ $\frac{x}{2}=2k\pi+\pi$

$\boxed{\begin{array}{l}x=4k\pi+\pi\\ x=4k\pi-\pi\end{array}}$ $\qquad$ $\cancel{x=4k\pi+2\pi}$

$x=\pi \qquad x=-\pi$ $\qquad$ $\boxed{|\pi-(-\pi)|=2\pi}$

۷) $\cos^2x-\sin^2x\cos 2x=1$ ت ۵ — ۲

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

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

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

$0,\ \pi,\ 2\pi$ $\qquad$ $\boxed{x=\frac{2k\pi}{2}+\frac{\pi}{2}}$

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

۸) $\frac{1-\tan x}{1+\tan x}=\tan 2x$ ۲

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

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

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

$\boxed{x=-\frac{k\pi}{3}+\frac{\pi}{12}}$

۹) $\sqrt{1+\sin 2x}=\sqrt{2}\cos 2x$ ت ۲ — ۱٫۷۵

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

$1+\sin 2x=2-2\sin^2 2x$

$2\sin^2 2x+\sin 2x-1=0$

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

$\sin 2x=\frac{1}{2} \quad =2k\pi+\frac{\pi}{6}$; $2k\pi+\frac{5\pi}{6}$

$x=k\pi-\frac{\pi}{4}$ | $x=k\pi+\frac{\pi}{12}$ | $x=k\pi+\frac{5\pi}{12}$

$\frac{3\pi}{4}$ $\quad$ $\frac{\pi}{12}$ $\quad$ $\frac{5\pi}{12}$

۱۰) ب) $\sin^3x-\cos^3x=-1$ ۱٫۲۵

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

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

۱۱) الف) $\sin^4x-\cos^4x=1$

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

$\cos 2x=-1$

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

$\boxed{x=k\pi+\frac{\pi}{2}}$ $\qquad$ $\frac{\pi}{2}$; $\frac{3\pi}{2}$

سوال ۵

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

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

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

سوال ۹

$$\sqrt{1+\sin 2x}=\sqrt{2}\cos 2x \xrightarrow{\text{توان ۲}} 1+\sin 2x=2\cos^2 2x$$

$$1+\sin 2x=2-2\sin^2 2x \to 2\sin^2 2x+\sin 2x-1=0$$ ، $\sin 2x=-1$ یا $\sin 2x=+\frac{1}{2}$

$$\sin 2x=-1 \to 2x=2k\pi-\frac{\pi}{2} \xrightarrow[k=1]{0\le x\le \pi} x=\frac{3\pi}{4}$$

$$\sin 2x=\frac{1}{2} \to 2x=2k\pi+\frac{\pi}{6} \text{ یا } 2k\pi+\frac{5\pi}{6} \xrightarrow[k=0]{0\le x\le \pi} x=\frac{\pi}{12} \text{ یا } \frac{5\pi}{12}$$

چون عبارت به توان ۲ رسیده است جواب زائد تولید می‌کند

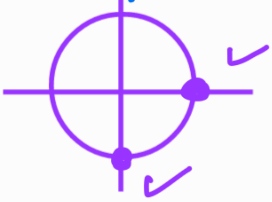
به ازای $x=\frac{5\pi}{12}$ ، $\cos 2x$ منفی می‌شود، پس جواب را ابطال است [illegible] است

★ معادله ۲ جواب دارد

۱۰ - ب

در سوالات به فرم $\pm\sin^n x \pm \cos^n x$ برابر 1 یا 1- فقط کافی است نقاط اصلی را چک کنی!

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



$x=2\pi$ یا 0

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