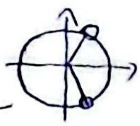
نام و نام خانوادگی ..[illegible].. **پاسخنامه تشریحی تکلیف شماره ..۱۷.. کلاس ..دوازدهم تجربی B..**

۱

$8\cos x - \tan^2 x = 1 \to 8\cos x = \underbrace{1+\tan^2 x}_{\frac{1}{\cos^2 x}} \to 8\cos^3 x = 1 \to \cos^3 x = \frac{1}{8}$

$\cos x \neq 0$

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



۲ جواب دارد ← $x \in \{\frac{\pi}{3}, \frac{5\pi}{3}\}$ ← $[0, 2\pi]$ در بازه‌ی ←

۲

$\underbrace{5\sin^2(x)}_{5-5\cos^2(x)} + \underbrace{2\cos(3x)}_{8\cos^3 x - 6\cos x} = -2$

$$\begin{array}{l|l} 8\cos^3 x - 5\cos^2 x - 6\cos x + 7 & \cos x + 1 \\ \hline -(8\cos^3 x + 8\cos^2 x) & 8\cos^2 x - 13\cos x + 7 \\ -13\cos^2 x - 6\cos x + 7 & \\ -(-13\cos^2 x - 13\cos x) & \\ 7\cos x + 7 & \end{array}$$

$\underbrace{8\cos^3 x - 5\cos^2 x - 6\cos x + 7}_{\text{یکی از ریشه‌ها ۱- است}} = 0$

ریشه ندارد

$\overbrace{(8\cos^2 x - 13\cos x + 7)}(\cos x + 1) = 0 \to \cos x = -1 \to x = 2k\pi + \pi$

$x = \{-\pi, \pi\}$ $\xleftarrow{x \in [-\pi, \pi]}$ دو جواب دارد

۳

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

$\downarrow$

$\underbrace{3\sin x - 4\sin^3 x}_{\sin 3x} = 1$

$\sin 3x = 1 \to 3x = 2k\pi + \frac{\pi}{2} \to x = \frac{2k\pi}{3} + \frac{\pi}{6}$

$\xrightarrow{x \in [0, 2\pi]} x = \{\frac{\pi}{6}, \frac{5\pi}{6}, \frac{9\pi}{6}\}$

جمع $= \frac{15\pi}{6} = \frac{5\pi}{2}$

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$\frac{1}{\underbrace{\sin(\frac{\pi+4x}{2})}_{\cos(2x)}} + \frac{1}{\underbrace{\cos(\frac{\pi+8x}{2})}_{-\sin(4x)}} = 0 \to \frac{\sin 4x - \cos 2x}{\sin 4x \cos 2x} = 0 \to \frac{2\sin 2x\cos 2x - \cos 2x}{2\sin 2x\cos^2 2x} = 0$

$\sin 2x \neq 0$

$\cos 2x \neq 0$

$2\sin 2x\cos 2x - \cos 2x = 0 \to \begin{cases} \cos 2x = 0 & \text{غ ق ق} \\ \sin 2x = \frac{1}{2} \to 2x = 2k\pi + \frac{\pi}{6},\ 2k\pi + \frac{5\pi}{6} \to x = k\pi + \frac{\pi}{12},\ k\pi + \frac{5\pi}{12} \xrightarrow{x \in [0, \pi]} x \in \{\frac{\pi}{12}, \frac{5\pi}{12}\} \end{cases}$

تفاضل $= \alpha = \frac{\pi}{3}$

$\tan 2\alpha = \tan\frac{2\pi}{3} = -\sqrt{3}$

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$\cos(x+\frac{\pi}{4}) = \frac{1}{\sqrt{3}}$

$\downarrow$

$\cos x \underbrace{\cos\frac{\pi}{4}}_{\frac{\sqrt{2}}{2}} - \sin x \underbrace{\sin\frac{\pi}{4}}_{\frac{\sqrt{2}}{2}} = \frac{1}{\sqrt{3}} \to \frac{\sqrt{2}}{2}(\cos x - \sin x) = \frac{\sqrt{3}}{3} \to \cos x - \sin x = \frac{\sqrt{6}}{3}$

$\uparrow$

$1 - \sin 2x = \frac{2}{3} \to \sin 2x = \frac{1}{3}$

$m\underbrace{(\cos x - \sin x)}_{\frac{\cancel{\sqrt{6}}}{3}} - 3\cancel{\sqrt{6}}\underbrace{\sin(2x)}_{\frac{1}{3}} = \cancel{\sqrt{6}} \to \frac{1}{3}m - 1 = 1 \to m = 6$

$$\sin\left(x+\frac{\pi}{6}\right)\cos\left(x-\frac{\pi}{3}\right)=1 \xrightarrow{x-\frac{\pi}{3}=t} \underbrace{\sin\left(t+\frac{\pi}{2}\right)}_{\cos(t)}\cos(t)=1 \to \cos^2(t)=1$$

$$\downarrow$$

$$\cos\left(x-\frac{\pi}{3}\right)=\pm 1$$

$$\downarrow$$

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

$$\downarrow$$

$$x=k\pi+\frac{\pi}{3} \xrightarrow{x\in[0,2\pi]} x=\left\{\frac{\pi}{3},\frac{4\pi}{3}\right\}$$

۲ جواب دارد 6

$$\sin x+\sqrt{3}\cos x=\sqrt{2} \to \frac{1}{2}\sin x+\frac{\sqrt{3}}{2}\cos x=\frac{\sqrt{2}}{2}$$

$$\cos\frac{\pi}{3}\sin x+\sin\frac{\pi}{3}\cos x=\frac{\sqrt{2}}{2} \to \sin\left(x+\frac{\pi}{3}\right)=\frac{\sqrt{2}}{2}$$

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

$$\downarrow$$

$$x=2k\pi-\frac{\pi}{12},\ 2k\pi+\frac{5\pi}{12} \xrightarrow{x\in[-\pi,2\pi]} x=\left\{-\frac{\pi}{12},\frac{5\pi}{12},\frac{23\pi}{12}\right\}$$

$\frac{9\pi}{4}=\frac{27\pi}{12}=$ [redacted] جمع 7

$$4\sin x\underbrace{\sin\left(\frac{3\pi}{2}-x\right)}_{-\cos(x)}=1 \to 4\sin x\cos x=-1 \to 2\sin 2x=-1 \to \sin 2x=-\frac{1}{2}$$

$$\downarrow$$

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

$$\downarrow$$

$$x=k\pi-\frac{\pi}{12},\ k\pi-\frac{5\pi}{12} \xrightarrow{x\in[0,2\pi]} x=\left\{\frac{11\pi}{12},\frac{7\pi}{12},\frac{23\pi}{12},\frac{19\pi}{12}\right\}$$

$5\pi=\frac{60\pi}{12}=$ جمع 8

$$\underbrace{(1+\cos(2\alpha))}_{2\cos^2(\alpha)}\underbrace{(1+\cos(4\alpha))}_{2\cos^2(2\alpha)}\underbrace{(1+\cos(8\alpha))}_{2\cos^2(4\alpha)}=\frac{1}{8} \xrightarrow{\times\frac{\sin^2\alpha}{\sin^2\alpha}} \frac{\sin^2\alpha\cdot 2\cos^2\alpha\cdot 2\cos^2 2\alpha\cdot 2\cos^2 4\alpha}{\sin^2\alpha}=\frac{1}{8}$$

$$\sin\alpha\neq 0 \to \alpha\neq k\pi$$

$$\frac{\cancel{\frac{1}{8}}\sin^2 8\alpha}{\sin^2\alpha}=\cancel{\frac{1}{8}} \to \sin^2 8\alpha=\sin^2\alpha \to \sin 8\alpha=\pm\sin\alpha$$

$$8\alpha=2k\pi+\alpha,\ 2k\pi+\pi-\alpha,\ 2k\pi-\alpha,\ 2k\pi+\pi+\alpha \to \alpha=\frac{2k\pi}{9},\ \frac{2k\pi}{9}+\frac{\pi}{9},\ \frac{2k\pi}{7},\ \frac{2k\pi}{7}+\frac{\pi}{7} \xrightarrow{[0,\pi]} \alpha=\left\{\frac{\pi}{9},\frac{2\pi}{9},\dots,\frac{8\pi}{9},\frac{\pi}{7},\dots,\frac{6\pi}{7}\right\}$$

[redacted] $\max=\frac{8\pi}{9}$ 9

$$\tan(3x)\tan(x)=1$$

$$\downarrow$$

$$\frac{\sin(3x)\sin(x)}{\cos(3x)\cos(x)}=1 \to \cos(3x)\neq 0 \to x\neq\frac{k\pi}{3}+\frac{\pi}{6};\quad \cos(x)\neq 0 \to x\neq k\pi+\frac{\pi}{2}$$

$$\to \sin(3x)\sin(x)=\cos(3x)\cos(x) \to \cos(3x)\cos(x)-\sin(3x)\sin(x)=0$$

$$\downarrow$$

$$\cos(4x)=0$$

$$\downarrow$$

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

$$\downarrow$$

$$x=\frac{k\pi}{4}+\frac{\pi}{8} \xrightarrow{x\in[\pi,2\pi]} x=\left\{\frac{9\pi}{8},\frac{11\pi}{8},\frac{13\pi}{8},\frac{15\pi}{8}\right\}$$

$6\pi=\frac{48\pi}{8}=$ جمع 10