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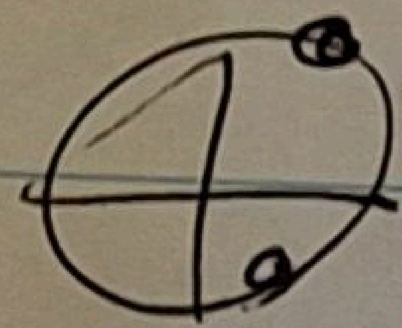
امیر کاشف

(۱)

$8\cos x - \tan^2 x = 1 \Rightarrow 8\cos x = 1+\tan^2 x \Rightarrow 8\cos x = \frac{1}{\cos^2 x}$

$8\cos^3 x = 1 \Rightarrow \cos^3 x = \frac{1}{8} \Rightarrow \cos x = \frac{1}{2}$



$x = 2k\pi + \frac{\pi}{3} \xrightarrow{k=0} x = \frac{\pi}{3}$

$x = 2k\pi + \frac{5\pi}{3} \xrightarrow{k=0} x = \frac{5\pi}{3}$

(۲)

$5\sin^2(x) + 2\cos(3x) = -2 \Rightarrow 5(1-\cos^2 x) + 2(4\cos^3 x - 3\cos x) = -2$

$\Rightarrow 5 - 5\cos^2 x + 8\cos^3 x - 6\cos x = -2 \Rightarrow \underbrace{(8\cos^2 x - 13\cos x + 7)}_{\text{بدون جواب}}(\cos x + 1) = 0$

$\cos x = -1 \Rightarrow \boxed{-\pi , \pi}$

(۳)

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

$3\sin x - 4\sin^3 x - 1 = 0 \xrightarrow{\sin x = -1 \text{ صدق کند}} (\sin x + 1)\underbrace{(-4\sin^2 x + 4\sin x - 1)}_{-(2\sin x - 1)^2} = 0$

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

$\sin x = \frac{1}{2} \Rightarrow x = \frac{\pi}{6} \quad x = \frac{5\pi}{6}$

۳ جواب

مجموع $= \frac{5\pi}{2}$

Date : ------/------/------

۴

$$\frac{1}{\sin(\frac{\pi}{2}+2x)} + \frac{1}{\cos(\frac{\pi}{2}+4x)} = 0 \Rightarrow \cancel{\sin(\frac{\pi}{2}+2x)} = -\cos(\frac{\pi}{2}+4x)$$

$$\cos 2x = \sin 4x$$

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

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

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

$$\frac{\pi}{12}, \frac{5\pi}{12}, \frac{\pi}{4} \to \Delta = \frac{\pi}{3}$$

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

۵

$$m(\cos x - \sin x) - 3\sqrt{6}\sin(2x) = \sqrt{6} \qquad \cos(x+\frac{\pi}{4}) = \frac{1}{\sqrt{3}} \qquad m?$$

$$\frac{\sqrt{2}}{2}(\cos x - \sin x) = \frac{1}{\sqrt{3}}$$

$$\cos x - \sin x = \sqrt{\frac{2}{3}} \qquad \sin 2x = 1 - (\cos x - \sin x)^2 = \frac{1}{3} \Rightarrow$$

$$m = 6$$

۶

$$\sin(x+\frac{\pi}{6})\cos(x-\frac{\pi}{3}) = 1$$

$$\cos(\frac{\pi}{2} - x - \frac{\pi}{6}) = \cos(\frac{\pi}{3} - x) \Rightarrow \cos^2(x-\frac{\pi}{3}) = 1$$

دو جواب

$$\cos(x-\frac{\pi}{3}) = \pm 1 \to 2k\pi = x - \frac{\pi}{3}, \quad 2k\pi + \pi = x - \frac{\pi}{3} \Rightarrow x = \frac{\pi}{3}, \quad x = \frac{4\pi}{3}$$

۷

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

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

$$2k\pi + \frac{3\pi}{4} = x + \frac{\pi}{3} \Rightarrow x = 2k\pi + \frac{5\pi}{12}$$

جواب‌ها $\Rightarrow -\frac{\pi}{12}, \frac{5\pi}{12}, \frac{23\pi}{12} \xrightarrow{\text{جمع}} \frac{9\pi}{4}$

Date : ------/----/----

8

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

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

$$2x = 2k\pi + \frac{5\pi}{6} \Rightarrow x = k\pi + \frac{5\pi}{12} \Rightarrow x = \frac{5\pi}{12}, \frac{17\pi}{12}$$

$$2x = 2k\pi + \frac{7\pi}{6} \Rightarrow x = k\pi + \frac{7\pi}{12} \Rightarrow x = \frac{7\pi}{12}, \frac{19\pi}{12}$$

4 جواب — 4

9

$$\underbrace{(1+\cos(2x))}_{2\cos^2 x}\underbrace{(1+\cos(4x))}_{2\cos^2 2x}\underbrace{(1+\cos(8x))}_{2\cos^2 4x} = \frac{1}{8}$$

$$\Rightarrow \cos^2 x\cos^2 2x\cos^2 4x = \frac{1}{64} \xrightarrow{\times \frac{\sin^2 x}{\sin^2 x}} \frac{\sin^2 8x}{\sin^2 x} = 1$$

$$\sin^2 8x = \sin^2 x$$

$$k=7$$

$$x = \frac{8\pi}{9}$$

10

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

$$\frac{\sin 3x \sin x}{\cos x \cos 3x} = 1 \Rightarrow \cos 3x\cos x + \sin 3x \sin x = \cos 4x = 0$$

$$x = \frac{k\pi}{4} + \frac{\pi}{8} = \left(\frac{2k+1}{8}\right)\pi \qquad x \to \frac{\pi}{8}, \frac{3\pi}{8}, \frac{5\pi}{8}, \ldots$$

8 جواب

$$4\pi$$

imar NOTEBOOK