علیرضا

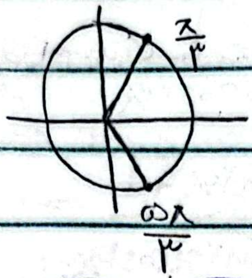
Subject.　　　　　　　　　　　　　　　　Date. / /

①

$8\cos x - \tan^2 x = 1 \rightarrow$

$8\cos x = 1 + \tan^2 x \Rightarrow 8\cos x = \dfrac{1}{\cos^2 x} \Rightarrow 8\cos^3 x = 1 \rightarrow$

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




۲ تا جواب

②

$5\sin^2 x + 2\cos 3x = -2 \Rightarrow 5(1-\cos^2 x) + 2(4\cos^3 x - 3\cos x) + 2 = 0$

$5 - 5\cos^2 x + 8\cos^3 x - 6\cos x + 2 = 0 \Rightarrow 8\cos^3 x - 5\cos^2 x - 6\cos x + 7 = 0$

$\Rightarrow (\cos x + 1)(8\cos^2 x - 13\cos x + 7) = 0 \Rightarrow \cos x = -1$

ریشه ندارد

$x = -\pi, \pi$

③

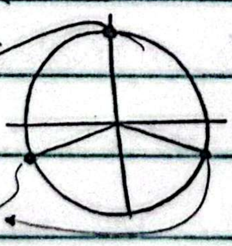
$2\sin x \cos 2x + \sin x = 1 \rightarrow \sin x(2\cos 2x + 1) = 1$

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

$3\sin x - 4\sin^3 x = 1 \longrightarrow 4\sin^3 x - 3\sin x - 1 = 0 \longrightarrow$

$(\sin x - 1)(4\sin^2 x + 4\sin x + 1) = 0 \Rightarrow (\sin x - 1)(2\sin x + 1) = 0$

$\sin x = 1$ 　　$\sin x = 1$ 　　$\sin x = \dfrac{-1}{2}$



$\sin x = -\dfrac{1}{2}$

۳ تا جواب

$\dfrac{\pi}{2}, \dfrac{7\pi}{6}, \dfrac{11\pi}{6}$

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(4)

$$\frac{1}{\sin\left(\frac{\pi+4x}{2}\right)}+\frac{1}{\cos\left(\frac{\pi+8x}{2}\right)}=0$$

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

$$\frac{1}{\cos 2x}+\frac{1}{-2\sin 2x\cos 2x}=\frac{-2\sin 2x+1}{-2\sin 2x\cos 2x}=0 \qquad \sin 2x\neq 0,\ \cos 2x\neq 0$$

$$-2\sin 2x+1=0 \rightarrow +2\sin 2x=1 \Rightarrow \sin 2x=1/2 \Rightarrow \frac{\pi}{12},\ \frac{5\pi}{12}$$

$$\frac{5\pi}{12}-\frac{\pi}{12}=\frac{4\pi}{12}=\frac{\pi}{3} \Rightarrow \tan 2\times\frac{\pi}{3}=\tan\frac{2\pi}{3} \Rightarrow -\sqrt{3}$$

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(5)

$$m(\cos x-\sin x)-3\sqrt{6}\sin 2x=\sqrt{6}$$

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

$$\cos x-\sin x=\frac{1}{\sqrt{3}}\times\frac{2}{\sqrt{2}}=\frac{2\sqrt{6}}{6}=\frac{\sqrt{6}}{3}$$

$$m\left(\frac{\sqrt{6}}{3}\right)-3\sqrt{6}\sin 2x=\sqrt{6}$$

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

$$\frac{2}{3}=2\sin x\cos x=\sin 2x$$

$$m\left(\frac{\sqrt{6}}{3}-3\sqrt{6}\times\frac{2}{3}=\sqrt{6}\Rightarrow\frac{\sqrt{6}}{3}m-2\sqrt{6}=\sqrt{6}\Rightarrow\frac{\sqrt{6}}{3}m=3\sqrt{6}\right.$$

$m=9$

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(۶)

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

$\sin^2(x+\frac{\pi}{6})=1 \longrightarrow \sin(x+\frac{\pi}{6})=\pm 1 \Rightarrow$ دو حالت داریم

$\sin(x+\frac{\pi}{6})=1 \longrightarrow x+\frac{\pi}{6}=\frac{\pi}{2} \Rightarrow x=\frac{4\pi}{12}=\frac{\pi}{3}$

$\sin(x+\frac{\pi}{6})=-1 \Rightarrow x+\frac{\pi}{6}=\frac{3\pi}{2} \Rightarrow x=\frac{8\pi}{6}=\frac{4\pi}{3}$

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(۷)

$\sin x+\sqrt{3}\cos x=\sqrt{2} \Rightarrow \sin x=\sqrt{2}-\sqrt{3}\cos x \Rightarrow$

$\sin^2 x=2+3\cos^2 x-2\sqrt{6}\cos x \Rightarrow 1-\cos^2 x=2+3\cos^2 x-2\sqrt{6}\cos x$

$\Rightarrow 4\cos^2 x-2\sqrt{6}\cos x+1=0 \Rightarrow \frac{2\sqrt{6}\pm\sqrt{24-16}}{8}=$

$\frac{2\sqrt{6}\pm 2\sqrt{2}}{8}$ → $\frac{\sqrt{6}-\sqrt{2}}{4}=75^\circ$ ; $\frac{\sqrt{6}+\sqrt{2}}{4}=-15,345$ → $405^\circ$

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(۸)

$4\sin x\sin(\frac{3\pi}{2}-x)=1 \Rightarrow -4\sin\alpha\cos\alpha=1 \Rightarrow$

$-2\sin 2\alpha=1 \Rightarrow \sin 2\alpha=\frac{-1}{2} \Rightarrow \alpha=\frac{7\pi}{12},\ \frac{11\pi}{12}$

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(۹)

$(1+\cos 2\alpha)(1+\cos 4\alpha)(1+\cos 8\alpha)=\frac{1}{8} \Rightarrow$

$(1+\cos 2\alpha)(1+2\cos^2 2\alpha-1)(1+2\cos^2 4\alpha-1)=\frac{1}{8} \Rightarrow$

$(2\cos^2\alpha)(2\cos^2 2\alpha)(2\cos^2 4\alpha)=\frac{1}{8} \Rightarrow \cos^2\alpha\cos^2 2\alpha\cos^2 4\alpha=\frac{1}{64}$

$\cos\alpha\cos 2\alpha\cos 4\alpha=\pm\frac{1}{8}$　　$\times\sin$

$\sin\alpha\cos\alpha\cos 2\alpha\cos 4\alpha=\pm\frac{\sin\alpha}{8}$　　$\sin 8\alpha=\sin\alpha$

$\frac{\sin 2\alpha}{2}$ , $\frac{\sin 4\alpha}{4}$ , $\frac{\sin 8\alpha}{8}=\pm\frac{1}{8}$ → $\sin 8\alpha=-\sin\alpha$

PARAMOUNT

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

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$8\alpha = 2k\pi + \alpha \Rightarrow \alpha = \frac{2k\pi}{7}$ $\quad$ $8\alpha = 2k\pi - \alpha \Rightarrow \alpha = \frac{2k\pi}{9}$

$8\alpha = 2k\pi + \pi - \alpha \Rightarrow \frac{2k\pi}{9} + \frac{\pi}{9}$ $\quad$ $8\alpha = 2k\pi + \pi + \alpha \Rightarrow \alpha = \frac{2k\pi}{7} + \frac{\pi}{7}$

$\tan 3x \times \tan x = 1 \Rightarrow \frac{\sin 3x \times \sin x}{\cos 3x \times \cos x} = 1 \Rightarrow$ 15

$\sin 3x \sin x = \cos 3x \cos x \Rightarrow \cos 3x \cos x - \sin 3x \sin x \Rightarrow$

$\cos(3x + x) = 0 \Rightarrow \cos 4x = 0 \Rightarrow x = \frac{9\pi}{8}, \frac{11\pi}{8}, \frac{13\pi}{8}, \frac{15\pi}{8}$