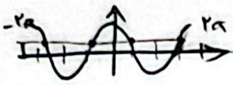
رزین شریان

① $8\cos x - \tan^2 x = 1 \quad [0, 2\pi]$

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



{جواب ۴}

② $5\sin^2 x + 2\cos 3x = -2$

$5\sin^2 x + 2(4\cos^3 x - 3\cos x) = -2 \to 5(1-\cos^2 x) + 8\cos^3 x - 6\cos x = -2$

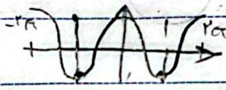
$5 - 5\cos^2 x + 8\cos^3 x - 6\cos x = -2 \xrightarrow{\cos x = a} 7 - 5a^2 + 8a^3 - 6a = 0 \xrightarrow[\text{برای این کار میکنیم}]{\text{مضرب یک}}$

$7 - 5 - 8 + 6$

$$\begin{array}{l|l} 8a^3 - 5a^2 - 6a + 7 & a+1 \\ \hline -8a^3 \mp 8a^2 & 8a^2 - 13a + 7 \\ -13a^2 - 6a & \\ \pm 13a^2 \pm 13a & \\ +7a + 7 & \end{array}$$

$(a+1)(8a^2 - 13a + 7) = 0$

کسینوس $= -1$; دلتا منفی



{$\pi, -\pi$} جواب ②

③ $2\sin x \cos 2x + \sin x = 1 \quad [0, 2\pi]$ $\qquad 2\sin^2 x = 1 - \cos 2x$

$\sin x(2\cos 2x + 1) = 1 \longrightarrow \sin x(2(1 - 2\sin^2 x) + 1) = 1 \longrightarrow \sin x(2 - 4\sin^2 x + 1) = 1$

$3\sin x - 4\sin^2 x - 1 = 0 \qquad 4\sin^2 x - 3\sin x + 1 = 0 \qquad \frac{3 \pm \sqrt{9-16}}{8} = \longrightarrow$ دلتا منفی جواب ندارد.

④ $\frac{1}{\sin(\frac{\pi + 4x}{2})} + \frac{1}{\cos(\frac{\pi + 8x}{2})} = 0 \qquad x_1 - x_2 = \alpha \qquad [0, \pi] \qquad \tan 2\alpha = ?$

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

$\cos 2x - \sin 4x = 0 \qquad \sin 4x = \cos 2x \qquad \sin 4x = \sin(\frac{\pi}{2} - 2x) \longrightarrow 4x = 2k\pi + \frac{\pi}{2} - 2x$

حالت ۲ $\qquad \longrightarrow 4x = 2k\pi + \pi - \frac{\pi}{2} + 2x$

$\longrightarrow x = \frac{\pi}{12}(4k+1) \longrightarrow \boxed{\frac{\pi}{12} \quad \frac{5\pi}{12}}$ ۲ جواب $\qquad \frac{9\pi}{12} \longrightarrow$ غیرقابل قبول $\quad \cos x$ صفر میشه

$\longrightarrow 2x = \frac{\pi}{2}(4k + 2 - 1) \longrightarrow x = \frac{\pi}{4}(4k+1) \longrightarrow$

اختلاف $= \frac{4\pi}{12} = \frac{\pi}{3} \qquad$ {$\tan\frac{2\pi}{3} = -\sqrt{3}$}

⑤ $m(\cos x - \sin x) - 4\sqrt{6}\sin 2x = \sqrt{6} \qquad \cos x \cos\frac{\pi}{4} - \sin x \sin\frac{\pi}{4} = \frac{1}{\sqrt{3}}$

$\frac{\sqrt{2}}{2}(\cos x - \sin x) = \frac{1}{\sqrt{3}} \longrightarrow \cos x - \sin x = \frac{2}{\sqrt{6}} = \frac{2\sqrt{6}}{6} = \frac{\sqrt{6}}{3}$

$\longrightarrow m(\frac{\sqrt{6}}{3}) - 3\sqrt{6}\sin 2x = \sqrt{6} \Rightarrow \frac{m}{3} - 3\sin 2x = 1 \longrightarrow \frac{m}{3} = 1 + 3\sin^2 x$

$m = 3 + 9\sin^2 x$

Subject. Day. Month. Year.

⑥ $\sin(x+\frac{\pi}{6})\cos(x-\frac{\pi}{3})=1 \quad [0 \;\; 2\pi]$

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

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

$\rightarrow \sin(x+\frac{\pi}{6})=1 \quad x+\frac{\pi}{6}=2k\pi+\frac{\pi}{2} \rightarrow 6x+\pi=12k\pi+3\pi \rightarrow 6x=\frac{12k\pi+2\pi}{6}$

$\rightarrow x=\frac{2\pi}{6}$

$\rightarrow \sin(x+\frac{\pi}{6})=-1 \quad x+\frac{\pi}{6}=2k\pi-\frac{\pi}{2} \rightarrow 6x+\pi=12k\pi-3\pi \rightarrow 6x=\frac{12k\pi-4\pi}{6}$

$x=\frac{8\pi}{6}$ ۲ جواب

$[-\pi \;\; 2\pi]$ ⑦ $\sin x+\sqrt{3}\cos x=\sqrt{2} \quad 2(\frac{1}{2}\sin x+\frac{\sqrt{3}}{2}\cos x)=\sqrt{2} \rightarrow \sin(x+\frac{\pi}{3})=\frac{\sqrt{2}}{2}$

$\rightarrow x+\frac{\pi}{3}=2k\pi+\frac{\pi}{4} \quad x=2k\pi-\frac{\pi}{12} \rightarrow x=\frac{24k\pi-\pi}{12}$

$\frac{-\pi}{12} \quad \frac{23\pi}{12}$

$\rightarrow x+\frac{\pi}{3}=2k\pi+\frac{3\pi}{4} \quad x=2k\pi+\frac{5\pi}{12} \rightarrow x=\frac{24k\pi+5\pi}{12}$

$\frac{-19\pi}{12} \quad \frac{5\pi}{12} \qquad \frac{5\pi}{12}-\frac{\pi}{12}+\frac{23\pi}{12}-\frac{19\pi}{12}=\frac{8\pi}{12}=\frac{2\pi}{3}$

$\frac{4\pi}{12}+\frac{4\pi}{12}$

⑧ $4\sin x\cos x=1 \quad [\;\;] \rightarrow \sin 2x=-\frac{1}{2}$

$\frac{7\pi}{6} \quad \frac{11\pi}{6}$

دایره برای ۲x رسم شده $\rightarrow 2x=\frac{11\pi}{6}+\frac{7\pi}{6}+\frac{11\pi}{6}+\frac{7\pi}{6}+4\pi$

$\rightarrow 2x=10\pi \rightarrow x=5\pi$

$\frac{\sin x}{2\sin\frac{x}{2}} \quad \frac{\frac{1}{2}\sin 2x}{} \quad \frac{1}{4}\sin 4x$

$\frac{\cos\frac{x}{2}\cos x\cos 2x}{2\sin\frac{x}{2}}=\frac{1}{8}$

⑨ $(2\cos^2\frac{x}{2})(2\cos^2 x)(2\cos^2 4x)=\frac{1}{8}$

$1=\frac{\sin 4x}{8\sin\frac{x}{2}}=\frac{1}{8} \rightarrow \sin 4x=\sin\frac{x}{2} \rightarrow 4x=2k\pi+\frac{x}{2} \rightarrow 8x=4k\pi+x \rightarrow x=\frac{4k\pi}{7}$

$\rightarrow 4x=2k\pi+\pi-\frac{x}{2} \rightarrow 8x=4k\pi+2\pi-x$

$\rightarrow 9x=\frac{4k\pi+2\pi}{9}$

$\rightarrow \sin 4x=-\sin\frac{x}{2} \rightarrow 4x=2k\pi-\frac{x}{2} \quad 8x=4k\pi-x \rightarrow x=\frac{4k\pi}{9}$

$\rightarrow 4x=2k\pi+\frac{\pi}{2}+\frac{x}{2} \rightarrow 8x=4k\pi+\pi+x \rightarrow x=\frac{4k\pi+\pi}{7}$

بزرگترین $=\frac{8\pi}{9}$

⑩ $\tan 3x=\cot x \rightarrow \tan 3x=\tan(\frac{\pi}{2}-x) \quad 3x=k\pi+\frac{\pi}{2}-x \quad 4x=\frac{\pi}{8}(2k+1)$

$\frac{5\pi}{8} \quad \frac{7\pi}{8} \quad \frac{9\pi}{8} \quad \frac{11\pi}{8} \quad \frac{13\pi}{8} \quad \frac{15\pi}{8}$

$\frac{3\times\frac{5}{2}\pi}{2\pi}=\frac{15\pi}{2}$