

$$\Lambda \cos x - \tan^2 x = 1 \rightarrow \Lambda \cos x = 1 + \tan^2 x \rightarrow \Lambda \cos x = \frac{1}{\cos^2 x} \rightarrow \cos^3 x = \frac{1}{\Lambda}$$

$$\rightarrow \boxed{\cos x = \frac{1}{\Lambda}} \rightarrow \text{دواب: } [0, 2\pi]$$

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$$8 \sin^2 x + 2 \cos^3 x = -2 \rightarrow 8 - 8 \cos^2 x + \Lambda \cos^3 x - 4 \cos x + 2 = 0$$

$$\rightarrow \Lambda \cos^3 x - 8 \cos^2 x - 4 \cos x + 7 = 0 \rightarrow \underbrace{(\cos x + 1)}_{\cos x = -1} (\underbrace{\Lambda \cos^2 x - 13 \cos x + 7}_{\text{فاکتوربش}}) = 0$$

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دواب: $[-\pi, \pi]$

$$2 \sin x \cos^2 x + \sin x = 1 \rightarrow \sin x (2 \cos^2 x + 1) = 1 \rightarrow \sin x (-2 \sin^2 x + 3) = 1$$

$$\rightarrow 2 \sin^3 x - 3 \sin x + 1 = 0 \rightarrow (\sin x + 1)(2 \sin^2 x - 5 \sin x + 1) = 0 \rightarrow (\sin x + 1)(2 \sin x - 1) = 0$$

$$\left. \begin{array}{l} \sin x = -1 \\ \sin x = \frac{1}{2} \end{array} \right\} \text{دواب: } \left[\frac{\pi}{6}, 2\pi \right] \quad \frac{\pi}{6} + \frac{5\pi}{6} + \frac{7\pi}{6} = \frac{13\pi}{6} = \frac{13\pi}{6} \quad \left(\frac{5\pi}{6} \right)$$

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

$$\sin 2x = \frac{1}{2} \rightarrow \left. \begin{array}{l} 2x = 2k\pi + \frac{\pi}{6} \rightarrow x = k\pi + \frac{\pi}{12} \\ 2x = 2k\pi + \frac{5\pi}{6} \rightarrow x = k\pi + \frac{5\pi}{12} \end{array} \right\} \text{دواب: } \left[\frac{\pi}{12}, \frac{5\pi}{12} \right]$$

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$$2 \alpha = \left(\frac{5\pi}{12} - \frac{\pi}{12} \right) \times 2 = \frac{4\pi}{6} \quad \tan\left(\frac{4\pi}{6}\right) = -\sqrt{3}$$

$$m(\cos x - \sin x) - 3\sqrt{4} \sin 2x = \sqrt{4} \rightarrow \frac{\sqrt{2} m}{\sqrt{2}} - 3\sqrt{4} \sin 2x = \sqrt{4}$$

$$\frac{\sqrt{2} m}{\sqrt{2}} = 2\sqrt{4} \rightarrow m = 4$$

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

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

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

$$\frac{\cos\left(\frac{\pi}{4} - x\right)}{\sin\left(x + \frac{\pi}{4}\right)} \quad x + \frac{\pi}{4} = k\pi + \frac{\pi}{4} \rightarrow x = k\pi + \frac{\pi}{4}$$

$$\frac{\text{دالة}}{[0, 2\pi]} \rightarrow \underline{\text{جواب}}$$

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

$$\sqrt{2} = \sqrt{3}$$

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

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

$$\left. \begin{array}{l} x = 2k\pi - \frac{\pi}{4} \\ x = 2k\pi + \frac{\pi}{2} \end{array} \right\} \frac{\text{دالة}}{[-\pi, 2\pi]} \rightarrow \underline{\text{جواب}}$$

$$\frac{\sin x}{\cos x} \sin\left(\frac{5\pi}{4} - x\right) = 1 \rightarrow \sin 2x = -\frac{1}{2}$$

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

$$2x = 2k\pi - \frac{3\pi}{4} \rightarrow x = k\pi - \frac{3\pi}{8}$$

$$\left. \begin{array}{l} x = k\pi - \frac{\pi}{8} \\ x = k\pi - \frac{3\pi}{8} \end{array} \right\} \frac{\text{دالة}}{[0, 2\pi]} \rightarrow \frac{5\pi}{12}, \frac{11\pi}{12}, \frac{19\pi}{12}, \frac{25\pi}{12}$$

$$\underline{\text{جواب}} \rightarrow \underline{8\pi}$$

$$(1 + \cos(2\alpha))(1 + \cos(4\alpha))(1 + \cos(8\alpha)) = \frac{1}{\lambda} \rightarrow \lambda \cos^2 \alpha \cos^2 2\alpha \cos^2 4\alpha = \frac{1}{\lambda} \xrightarrow{\text{حذف}}$$

$$|\cos \alpha \cos 2\alpha \cos 4\alpha| = \frac{1}{\lambda} \rightarrow \left| \frac{\sin 8\alpha}{\lambda \sin \alpha} \right| = \frac{1}{\lambda} \rightarrow |\sin 8\alpha| = |\sin \alpha| \quad \text{دالة} \rightarrow \underline{\frac{4\pi}{5}}$$

$$\sin 8\alpha = \sin \alpha \rightarrow 8\alpha = 2k\pi + \alpha \rightarrow \alpha = \frac{7k\pi}{7} \rightarrow \frac{7\pi}{7}, \frac{14\pi}{7}, \frac{21\pi}{7}, \frac{28\pi}{7}, \frac{35\pi}{7}, \frac{42\pi}{7}, \frac{49\pi}{7} \leftarrow [0, \pi]$$

$$\rightarrow 8\alpha = 2k\pi + \pi - \alpha \rightarrow \alpha = \frac{2k\pi + \pi}{9} \rightarrow \frac{2\pi}{9}, \frac{4\pi}{9}, \frac{6\pi}{9}, \frac{8\pi}{9}, \frac{10\pi}{9}, \frac{12\pi}{9}, \frac{14\pi}{9}, \frac{16\pi}{9}, \frac{18\pi}{9}, \frac{20\pi}{9}, \frac{22\pi}{9}, \frac{24\pi}{9}, \frac{26\pi}{9}, \frac{28\pi}{9}, \frac{30\pi}{9}, \frac{32\pi}{9}, \frac{34\pi}{9}, \frac{36\pi}{9}, \frac{38\pi}{9}, \frac{40\pi}{9}, \frac{42\pi}{9}, \frac{44\pi}{9}, \frac{46\pi}{9}, \frac{48\pi}{9}, \frac{50\pi}{9}, \frac{52\pi}{9}, \frac{54\pi}{9}, \frac{56\pi}{9}, \frac{58\pi}{9}, \frac{60\pi}{9}$$

$$\sin 8\alpha = \sin -\alpha \rightarrow 8\alpha = 2k\pi - \alpha \rightarrow \alpha = \frac{2k\pi}{9} \rightarrow \frac{2\pi}{9}, \frac{4\pi}{9}, \frac{6\pi}{9}, \frac{8\pi}{9}, \frac{10\pi}{9}, \frac{12\pi}{9}, \frac{14\pi}{9}, \frac{16\pi}{9}, \frac{18\pi}{9}, \frac{20\pi}{9}, \frac{22\pi}{9}, \frac{24\pi}{9}, \frac{26\pi}{9}, \frac{28\pi}{9}, \frac{30\pi}{9}, \frac{32\pi}{9}, \frac{34\pi}{9}, \frac{36\pi}{9}, \frac{38\pi}{9}, \frac{40\pi}{9}, \frac{42\pi}{9}, \frac{44\pi}{9}, \frac{46\pi}{9}, \frac{48\pi}{9}, \frac{50\pi}{9}, \frac{52\pi}{9}, \frac{54\pi}{9}, \frac{56\pi}{9}, \frac{58\pi}{9}, \frac{60\pi}{9}$$

$$\rightarrow 8\alpha = 2k\pi + \pi + \alpha \rightarrow \alpha = \frac{2k\pi + \pi}{9} \rightarrow \frac{2\pi}{9}, \frac{4\pi}{9}, \frac{6\pi}{9}, \frac{8\pi}{9}, \frac{10\pi}{9}, \frac{12\pi}{9}, \frac{14\pi}{9}, \frac{16\pi}{9}, \frac{18\pi}{9}, \frac{20\pi}{9}, \frac{22\pi}{9}, \frac{24\pi}{9}, \frac{26\pi}{9}, \frac{28\pi}{9}, \frac{30\pi}{9}, \frac{32\pi}{9}, \frac{34\pi}{9}, \frac{36\pi}{9}, \frac{38\pi}{9}, \frac{40\pi}{9}, \frac{42\pi}{9}, \frac{44\pi}{9}, \frac{46\pi}{9}, \frac{48\pi}{9}, \frac{50\pi}{9}, \frac{52\pi}{9}, \frac{54\pi}{9}, \frac{56\pi}{9}, \frac{58\pi}{9}, \frac{60\pi}{9}$$

$$\tan^2 x \times \tan x = 1 \xrightarrow{\tan x = t} \frac{t^3 - t^2}{1 - t^2} \times t = 1 \rightarrow t^4 - 4t^2 + 1 = 0 \rightarrow \tan x = \pm \sqrt{2 \pm \sqrt{2}}$$

$$\tan x = \pm \tan \frac{\pi}{4} \rightarrow x = k\pi \pm \frac{\pi}{4}$$

$$\tan x = \pm \tan \frac{5\pi}{4} \rightarrow x = k\pi \pm \frac{5\pi}{4}$$

$$\left. \begin{array}{l} x = k\pi \pm \frac{\pi}{4} \\ x = k\pi \pm \frac{5\pi}{4} \end{array} \right\} \frac{\text{دالة}}{[0, 2\pi]} \rightarrow \frac{7\pi}{4}, \frac{11\pi}{4}, \frac{15\pi}{4}, \frac{19\pi}{4}$$

$$\underline{\text{جواب}} \rightarrow \underline{4\pi}$$