

$$1 + \tan^2 n = 1 (\cos n \neq 0) \Rightarrow \frac{1}{\cos^2 n} = 1 (\cos n \neq 0) \Rightarrow \cos^2 n = \frac{1}{1}$$

$$\Rightarrow \cos n = \pm \frac{1}{2} \Rightarrow n = 2k\pi \pm \frac{\pi}{3} \quad \text{در جواب}$$

$$\bullet \cos^3 n = -2 (1 + \cos^2 n)$$

چون طرف چپ تساوی همیشه ≤ 0 است و طرف راست همیشه ≥ 0 است پس $\sin^2 n = 0$ و $\cos^3 n = -1$ بوده

$$\Rightarrow \sin n = 0 \Rightarrow n = \{0, \pi, 2\pi, \dots\}$$

$$\cos^3 n = -1 \Rightarrow n = \pi, -\pi, 3\pi, -3\pi, \dots$$

پس در جواب: π و $-\pi$

$$2 \sin n (1 - 2 \sin^2 n) + \sin n = 1$$

$$2 \sin n - 4 \sin^3 n + \sin n = 1$$

$$3 \sin n - 4 \sin^3 n = 1$$

$$\sin^3 n = 1$$

$$n = 2k\pi + \frac{\pi}{2}$$

$$n = \frac{\pi}{2} + k\pi \rightarrow n = \left\{ \frac{\pi}{2}, \frac{3\pi}{2}, \frac{5\pi}{2}, \dots \right\} \Rightarrow \frac{\pi}{2} + \frac{3\pi}{2} + \frac{5\pi}{2} = \frac{9\pi}{2}$$

$$\frac{1}{\cos^2 n} + \left(-\frac{1}{\sin^2 n} \right) = 0 \Rightarrow \cos^2 n = \sin^2 n \Rightarrow \cos^2 n = 2 \sin^2 n \cos^2 n$$

$$\Rightarrow \sin^2 n = \frac{1}{2} \Rightarrow n = \frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{4}$$

$$\frac{3\pi}{4} - \frac{\pi}{4} = \frac{\pi}{2} = a \Rightarrow 2a = \frac{\pi}{2} \Rightarrow \tan 2a = -\sqrt{3}$$

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

$$\Rightarrow \frac{1}{\sqrt{3}} (\cos n - \sin n) = \frac{1}{\sqrt{3}} \Rightarrow \cos n - \sin n = \frac{\sqrt{3}}{3}$$

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

$$\Rightarrow \frac{\sqrt{3}}{3} m - 3\sqrt{3} \sin\left(\frac{1}{m}\right) = \sqrt{3} \Rightarrow m = 4$$

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

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

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

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

دو جواب

$$\sin\left(x + \frac{\pi}{4}\right) = \frac{\sqrt{2}}{2} \Rightarrow x + \frac{\pi}{4} = 2k\pi + \frac{\pi}{4}$$

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

$$\Rightarrow x = -\frac{\pi}{4}, \frac{5\pi}{4}, \frac{9\pi}{4} \Rightarrow \frac{2\sqrt{2}\pi}{12}$$

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

$$\Rightarrow 2\sin x \cos x = -1 \Rightarrow \sin 2x = -\frac{1}{2} \Rightarrow 2x = 2k\pi + \frac{5\pi}{6}$$

$$\Rightarrow x = k\pi + \frac{5\pi}{12}, k\pi + \frac{11\pi}{12} \Rightarrow x = \frac{5\pi}{12}, \frac{19\pi}{12}, \frac{11\pi}{12}, \frac{23\pi}{12}$$

$$\Rightarrow \text{مجموع} = \frac{40\pi}{12}, 0\pi$$

$$(\cos^2 a)(\cos^2 a)(\cos^2 a) = \frac{1}{8} \Rightarrow \cos^2 a \cos^2 a \cos^2 a = \frac{1}{8}$$

$$\Rightarrow \cos a \cos a \cos a = \pm \frac{1}{2} \xrightarrow{\times \sin a} \sin a \cos a = \pm \frac{1}{2} \sin a$$

$$\sin a \cos a = \sin a \Rightarrow a = 2k\pi + a \Rightarrow a = \frac{2k\pi}{2}$$

$$\sin a \cos a = \sin(-a) \Rightarrow a = 2k\pi - a \Rightarrow a = \frac{2k\pi}{2}$$

$$\sin a \cos a = \sin(a + \pi) \Rightarrow a = 2k\pi + \pi - a \Rightarrow a = \frac{(2k+1)\pi}{2}$$

$$a = 2k\pi + \pi - (-a) \Rightarrow a = \frac{(2k+1)\pi}{2}$$

$$\text{ادغام : } x = \frac{k\pi}{2}, \frac{k\pi}{2} \Rightarrow \max = \frac{\pi}{2}$$

$$\tan x = \cot x$$

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

$$x = \frac{k\pi}{2} + \frac{\pi}{2} \Rightarrow x = \frac{3\pi}{2}, \frac{5\pi}{2}, \frac{7\pi}{2}, \frac{9\pi}{2}$$

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