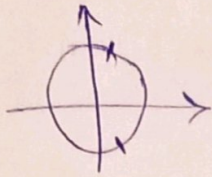


$$1 \cos u = 1 + \tan^2 u \Rightarrow 1 \cos u = \frac{1}{\cos^2 u} \Rightarrow 1 \cos^3 u = 1 \Rightarrow \cos^3 u = \frac{1}{1}$$

$$\Rightarrow \cos u = \frac{1}{1}$$



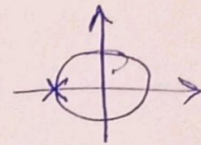
دارد $[0, 2\pi]$ جواب $\left(\frac{0\pi}{1}, \frac{2\pi}{1}\right)$ است.

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$$4 \sin^2 u + 2 \cos^2 u = -2 \Rightarrow 4(1 - \cos^2 u) + 2 \cos^2 u = -2$$

$$4 \cos^2 u - 2 \cos^2 u - 4 \cos u + 4 = 0 \quad (a+c=b+d) \Rightarrow$$

$$(\cos u + 1)(\underbrace{1 \cos^2 u - 1 \cos u + 1}_{\Delta < 0}) = 0 \Rightarrow \cos u = -1$$



دارد $[-\pi, \pi]$ جواب است.

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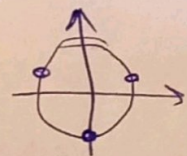
$$2 \sin u \cos^2 u + \sin u = 1 \Rightarrow 2 \sin u (1 - \sin^2 u) + \sin u = 1$$

$$\Rightarrow 2 \sin^3 u - 2 \sin u + 1 = 0 \quad (a+b=c) \Rightarrow (\sin u + 1)(2 \sin^2 u - 2 \sin u + 1) = 0$$

$$\sin u = -1 \quad \frac{3\pi}{2} = u \quad (2 \sin^2 u - 2 \sin u + 1)^2$$

$$\sin u = \frac{1}{2} \quad u = \frac{\pi}{6} \rightarrow \frac{5\pi}{6}$$

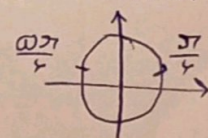
$$\frac{\pi}{4} + \frac{5\pi}{4} + \frac{3\pi}{4} = \frac{9\pi}{4}$$



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

$$\frac{-2 \sin \pi + 1}{-2 \sin \pi \cos \pi} = 0 \Rightarrow -2 \sin \pi + 1 = 0 \Rightarrow \sin \pi = \frac{1}{2}$$



$$\pi = \frac{\pi}{4} \quad \pi = \frac{3\pi}{4}$$

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$$\text{اختلاف} = \frac{5\pi}{12} - \frac{\pi}{12} = \frac{4\pi}{12} = \frac{\pi}{3} \quad \tan \frac{\pi}{3} = \tan 60^\circ = \sqrt{3}$$

$$m(\cos u - \sin u) - 3\sqrt{4} \sin(\pi) = \sqrt{4} \quad \sin u + \cos u = \sqrt{2} \sin\left(u + \frac{\pi}{4}\right)$$

$$-m\sqrt{2} \sin\left(u + \frac{\pi}{4}\right) - 3\sqrt{4} \sin(\pi) = \sqrt{4} \Rightarrow -m \sin\left(u + \frac{\pi}{4}\right) - 3\sqrt{2} \sin(\pi) = \sqrt{2}$$

$$\frac{\sqrt{2}}{m} m - 3\sqrt{2} \sin \pi = \sqrt{2} \Rightarrow m - 9 \sin \pi = 10 \quad \underline{m=9}$$

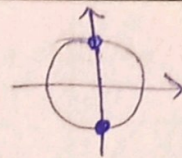
$$\cos\left(u + \frac{\pi}{4}\right) = \frac{\sqrt{2}}{m} \Rightarrow \sin\left(u + \frac{\pi}{4}\right) = \frac{\sqrt{2}}{m} \quad \sin 2\alpha = 2 \sin \alpha \cos \alpha = 2 \times \frac{\sqrt{2}}{m} \times \frac{\sqrt{2}}{m} = \frac{4}{m}$$

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$$\sin\left(\pi + \frac{\pi}{4}\right) = \frac{\sqrt{2}}{m} \quad \cos \pi = \frac{\sqrt{2}}{m} \rightarrow \sin \pi = \frac{1}{m} \quad (\sin \pi \text{ و } \cos \pi)$$

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

$$\sin\left(\underbrace{n + \frac{\pi}{4}}_{\alpha}\right) \cos\left(\underbrace{\frac{\pi}{4} - n}_{\beta}\right) = 1 \quad \alpha + \beta = 90^\circ$$



$$\sin\left(n + \frac{\pi}{4}\right) \sin\left(n + \frac{\pi}{4}\right) = 1 \Rightarrow \sin^2\left(n + \frac{\pi}{4}\right) = 1 \xrightarrow{+} \sin\left(n + \frac{\pi}{4}\right) = -1$$

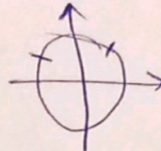
$$\sin\left(n + \frac{\pi}{4}\right) = 1 \quad n + \frac{\pi}{4} = \frac{\pi}{2} \quad n = \frac{\pi}{4}$$

$$n + \frac{\pi}{4} = \frac{5\pi}{2} \quad n = \frac{9\pi}{4}$$

جواب: $\frac{\pi}{4}, \frac{9\pi}{4}$

$$\sin n + \sqrt{2} \cos n = \sqrt{2} \quad (a \sin n + b \cos n = \frac{a}{|a|} \sqrt{a^2 + b^2} \sin(n + \alpha))$$

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



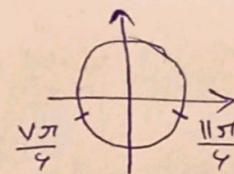
$$n + \frac{\pi}{4} = 2K\pi + \frac{\pi}{2} \Rightarrow n = 2K\pi - \frac{\pi}{4}$$

$$n + \frac{\pi}{4} = 2K\pi + \frac{5\pi}{2} \Rightarrow n = 2K\pi + \frac{9\pi}{4} \quad n = -\frac{\pi}{4}, 2\pi - \frac{\pi}{4}, \frac{5\pi}{2}$$

$$2\pi + \frac{5\pi}{2} - \frac{\pi}{4} = 2\pi + \frac{9\pi}{4} = 2\pi + \frac{\pi}{4} = \frac{9\pi}{4} \quad \therefore \text{جواب}$$

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

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



$$2n = 2K\pi - \frac{\pi}{2} \quad n = K\pi - \frac{\pi}{4}$$

$$2n = 2K\pi - \frac{3\pi}{2} \quad n = K\pi - \frac{3\pi}{4}$$

$$\text{جواب: } \pi - \frac{\pi}{4}, 2\pi - \frac{\pi}{4}, \pi - \frac{3\pi}{4}, 2\pi - \frac{3\pi}{4} \quad \text{جواب: } 4\pi - \pi = 3\pi$$

$$1 + \cos^2 \alpha = 2 \cos^2 \alpha \quad 1 + \cos^2 \alpha = 2 \cos^2 \alpha \quad 1 + \cos^2 \alpha = 2 \cos^2 \alpha$$

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

$$\Rightarrow (\cos \alpha)(\cos \alpha)(\cos \alpha) = \frac{1}{\Lambda} \times \frac{\sin \alpha}{\sin \alpha} \quad \frac{1}{f} \sin \alpha \cos^2 \alpha \cos^2 \alpha = \frac{1}{\Lambda}$$

$$\Rightarrow \frac{1}{\Lambda} \sin \Lambda \alpha = \frac{1}{\Lambda} \Rightarrow \sin \Lambda \alpha = 1$$

$$\Lambda \alpha = 2K\pi + \frac{\pi}{2} \quad \alpha = \frac{K\pi}{\Lambda} + \frac{\pi}{14} \quad \text{Max}_{K=14} = \frac{14\pi}{14}$$

$$\tan(\pi_n) = \frac{1}{\tan n} \Rightarrow \tan(\pi_n) = \cot n \Rightarrow \tan(\pi_n) = \tan\left(\frac{\pi}{4} - n\right)$$

$$\Rightarrow \pi_n = K\pi + \frac{\pi}{4} - n \Rightarrow n = \frac{K\pi}{4} + \frac{\pi}{4}$$

$$\text{جواب: } \frac{9\pi}{4} + \frac{11\pi}{4} + \frac{13\pi}{4} + \frac{15\pi}{4} = \frac{4\pi}{1}$$

$$K = 4, 8, 12, 16$$