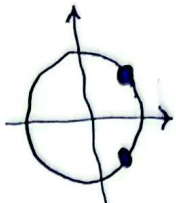


$$\rightarrow 1 \cos x = 1 + \tan^2 x = \frac{1}{\cos^2 x} \xrightarrow{\cos x \neq 0} \cos^3 x = \frac{1}{1}$$

$$\rightarrow \cos x = \frac{1}{1} \rightarrow x = 2k\pi \pm \frac{\pi}{3} \xrightarrow{[0, 2\pi]} \frac{\pi}{3}, \frac{5\pi}{3}$$

در بازه $[0, 2\pi]$ جواب دارد



با توجه به $\sin^2 x + 2 \cos^2 x = -2$ و $\sin x$ و $\cos x$ مقادیری که می توانند داشته باشند، کمتر از ۱ است پس:

۱. $\sin x = 0 \xrightarrow{[-\pi, \pi]} x \in (-\pi, \pi)$

۲. $\cos^3 x = -1 \rightarrow x = 2k\pi + \pi \rightarrow x = \frac{2k\pi}{3} + \frac{\pi}{3} \xrightarrow{[-\pi, \pi]} -\pi, -\frac{\pi}{3}, \frac{\pi}{3}, \pi$

معادله ۴ جواب دارد

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

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

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

تغییر $\alpha = \frac{\pi}{4}$

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

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

$\tan 2\alpha = \tan \frac{\pi}{2} = \frac{\sqrt{3}}{1}$

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

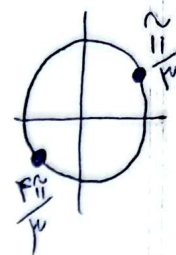
$$\rightarrow \frac{m}{2} - 3 \sin^2 x = 1 \rightarrow \cos x \sin x = \frac{\sqrt{2}}{2} \xrightarrow{\text{توان}} 1 - \sin^2 x = \frac{4}{m}$$

$\sin^2 x = \frac{1}{m}$

$m = 3 + 4 \sin^2 x \rightarrow m = 3 + 4 \left(\frac{1}{m} \right) \in \mathbb{C}$

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

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



و لڳو $[0, 2\pi]$ ۾
 $\frac{\pi}{4}, \frac{5\pi}{4}$

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

$$\rightarrow 2 \sin(x + \frac{\pi}{4}) = \sqrt{2} \rightarrow \sin(x + \frac{\pi}{4}) = \frac{\sqrt{2}}{2} = \sin(\frac{\pi}{4})$$

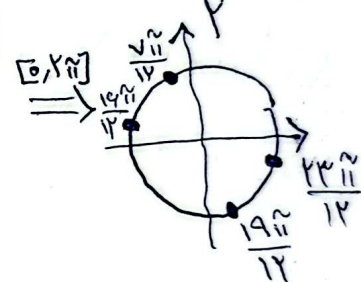
$$\rightarrow x + \frac{\pi}{4} = 2k\pi + \frac{\pi}{4} \rightarrow x = 2k\pi$$

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

$$\rightarrow -2 \sin x \cos x = -2 \sin 2x = 1 \rightarrow \sin 2x = -\frac{1}{2} = \sin(\frac{7\pi}{6})$$

$$\rightarrow 2x = 2k\pi + \frac{7\pi}{6} \rightarrow x = k\pi + \frac{7\pi}{12}$$

$$\rightarrow 2x = 2k\pi + \frac{5\pi}{6} \rightarrow x = k\pi + \frac{5\pi}{12}$$



$$S = \frac{7\pi/12 + 5\pi/12 + 7\pi/12 + 5\pi/12}{12} = \frac{9\pi}{12}$$

$$\times \frac{1 - \cos \alpha}{1 - \cos \alpha} \rightarrow \frac{\sin^2 \alpha}{1 - \cos \alpha} \frac{(1 + \cos \alpha)(1 + \cos \alpha)}{1 - \cos \alpha} = \frac{\sin^2 \alpha}{1 - \cos \alpha} \frac{1 + \cos \alpha}{1 - \cos \alpha} = \frac{\sin^2 \alpha}{1 - \cos \alpha} \frac{1}{1 - \cos \alpha} = \frac{1}{1 - \cos \alpha}$$

$$\rightarrow \sin^2 \alpha = \frac{1 - \cos \alpha}{1 - \cos \alpha} = \sin \alpha \rightarrow \sin \alpha = \pm \sin \alpha$$

$$\rightarrow \alpha = \frac{2k\pi}{2} \rightarrow \alpha = \frac{2k\pi}{2} + \frac{\pi}{2} \rightarrow \alpha = \frac{2k\pi}{2} + \frac{\pi}{2}$$

$$\rightarrow \tan 2x = \frac{1}{\tan x} = \cot x \rightarrow \frac{\sin 2x}{\cos 2x} = \frac{\cos x}{\sin x} \rightarrow \cos 2x \cos x = \sin 2x \sin x$$

$$\rightarrow \cos 2x \cos x - \sin 2x \sin x = \cos 2x = 0 = \cos \frac{\pi}{2} \rightarrow 2x = 2k\pi + \frac{\pi}{2}$$

$$9\pi = \frac{7\pi}{12} = \frac{9\pi}{12} + \frac{\pi}{12} + \frac{13\pi}{12} + \frac{17\pi}{12}$$

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