

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

$$\rightarrow 1 \cos^3 x = 1 \rightarrow \boxed{\cos x = -\frac{1}{2}} \rightarrow \text{در بازه } [0, \pi] \text{ دو جواب دارد}$$

$$5 - 5 \cos^2 x + 1 \cos^3 x - 4 \cos x + 2 = 0$$

۲ - دو جواب

عبارت جمع توان یکی زوج و فرد برابر

$$\cos x = -1$$

$$x = -\pi, \pi$$

$$\sin(x) \cos(x) = \sin(x) \cos(x)$$

$$2 \sin(x) (1 - \sin^2(x)) = 1$$

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

$$\sin 2x$$

$$\boxed{\sin 2x = \sin \frac{\pi}{2}}$$

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

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

$$\rightarrow \pi + \frac{\pi}{4} = \frac{5\pi}{4}$$

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

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

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

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

$$\boxed{x = \frac{\pi}{2}}$$

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

$$\rightarrow \tan x = \tan \frac{\pi}{2} = \sqrt{3}$$

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

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

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

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

$$\rightarrow \sin 2x = \frac{1}{2}$$

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

$$m = 5$$

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

دو برابر

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

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

$$x = \frac{\pi}{4}$$

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

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

$$x = \frac{5\pi}{4}$$

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

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

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

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

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

$$x = -\frac{\pi}{4}, \frac{3\pi}{4}$$

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

$$x = \frac{5\pi}{4}$$

$$\text{مجموع} = \frac{2\sqrt{2}}{2}$$

$$\sin(\frac{5\pi}{4} - x) = -\cos x$$

$$\rightarrow -2 \sin 2x = 1$$

$$\sin 2x = -\frac{1}{2}$$

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

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

$$x = \frac{7\pi}{12}, \frac{11\pi}{12}$$

$$\frac{11\pi}{12}, \frac{19\pi}{12}$$

$$\frac{25\pi}{12}$$

$$\text{مجموع} = \frac{5\pi}{6}$$

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

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$$\rightarrow (\cos \alpha \cos 2\alpha \cos 4\alpha)^2 = \frac{1}{64} \rightarrow |\cos \alpha \cos 2\alpha \cos 4\alpha| = \frac{1}{8}$$

$$\times |\sin \alpha| \rightarrow \sin 8\alpha = \pm \sin \alpha$$

$$\rightarrow 8\alpha = 2k\pi + \alpha \rightarrow x = \frac{7k\pi}{7} \rightarrow \alpha_{\max} = \frac{5\pi}{7}$$

$$8\alpha = 2k\pi + \pi - \alpha \rightarrow \alpha_{\max} = \frac{5\pi}{7}$$

$$8\alpha = 2k\pi - \alpha \rightarrow \alpha_{\max} = \frac{5\pi}{7}$$

$$8\alpha = 2k\pi + 2\pi - \alpha \rightarrow \alpha_{\max} = \frac{5\pi}{7}$$

$$\tan(x) = \cot(\pi/2 - x)$$

$$\rightarrow \cot(\frac{\pi}{2} - x) = \cot(\pi/2 - x)$$

$$\rightarrow \pi/2 - x = k\pi + \frac{\pi}{2} - x \rightarrow x = \frac{k\pi}{1} + \frac{\pi}{1}$$

$$\rightarrow x = \frac{\pi}{1}, \frac{2\pi}{1}, \frac{3\pi}{1}, \frac{4\pi}{1}, \frac{5\pi}{1}, \frac{6\pi}{1}, \frac{7\pi}{1}, \frac{8\pi}{1}$$

$$\frac{5\pi}{1} + \frac{5\pi}{1} = \frac{10\pi}{1} \rightarrow \frac{5\pi}{1}$$