

14 آفرین 4, 10

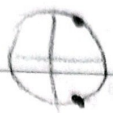
تلف

از این فصل

$$\Delta \cos x - \tan^2 x = 1 \Rightarrow \Delta \cos x = 1 + \tan^2 x$$

$$\rightarrow \Delta \cos x = \frac{1}{\cos^2 x} \xrightarrow{\cos x} \Delta \cos^3 x = 1 \rightarrow \cos x = \frac{1}{\cos^2 x}$$

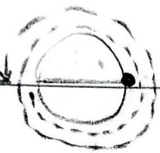
$$x = 2k\pi \pm \frac{\pi}{3} \quad \text{جواب ۲}$$



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

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

$$\cos x = 1 \rightarrow \text{جواب ۲}$$



π, -π ✓

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

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

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

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

$$\sin x = \frac{1}{2} \rightarrow x = 2k\pi + \frac{\pi}{6}, 2k\pi + \frac{5\pi}{6}$$

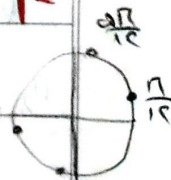
$$\Rightarrow \frac{\pi}{6} + \frac{5\pi}{6} + \frac{3\pi}{2} = \frac{5\pi}{2}$$

$$2 \cos^2 x \sin x$$

$$\frac{1}{\cos^2 x} = \frac{1}{\sin^2 x} \Rightarrow \cos^2 x = \sin^2 x \rightarrow 1 = 2 \sin^2 x$$

$$\sin^2 x = \frac{1}{2} \rightarrow \begin{cases} x = 2k\pi + \frac{\pi}{4} \\ x = 2k\pi + \frac{3\pi}{4} \end{cases}$$

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



$$\cos m - \sin m = \sqrt{r} \cos\left(m + \frac{\pi}{4}\right) = \frac{\sqrt{r}}{\sqrt{r}}, (\cos m - \sin m) = 1 - \sin m$$

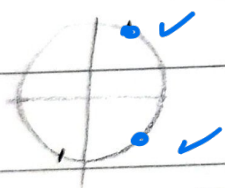
$$\Rightarrow \sin m = 1 - \frac{1}{r} = \frac{1}{r} \Rightarrow m\left(\frac{\sqrt{r}}{\sqrt{r}}\right) = \sqrt{4} \times \frac{1}{r} = \sqrt{4}$$

$$\Rightarrow m \times \frac{\sqrt{r}}{\sqrt{r}} = \sqrt{4} \rightarrow m = 4$$

$$\sin\left(m + \frac{\pi}{4}\right) \cos\left(\frac{\pi}{r} - m\right) = 1 \xrightarrow{r=1} \sin^2\left(x + \frac{\pi}{4}\right) = 1 \quad \text{1105} \quad 4$$

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

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



$$\sin m + \sqrt{r} \cos m = \sqrt{r} \rightarrow r \sin\left(m + \frac{\pi}{4}\right) = \sqrt{r}$$

$$\sin\left(m + \frac{\pi}{4}\right) = \frac{\sqrt{r}}{r} \rightarrow \begin{cases} m + \frac{\pi}{4} = 2k\pi + \frac{\pi}{2} \rightarrow m = 2k\pi - \frac{\pi}{4} \\ m + \frac{\pi}{4} = 2k\pi + \pi - \frac{\pi}{4} \rightarrow m = 2k\pi + \frac{3\pi}{4} \end{cases}$$

$$x = \frac{\pi}{12}, \frac{5\pi}{12}, \frac{13\pi}{12}, \frac{17\pi}{12} \rightarrow \frac{9\pi}{2}$$

$$r \sin m \sin\left(\frac{3\pi}{4} - m\right) = 1 \rightarrow r \sin m \cos(-\alpha) = 1$$

$$-r (r \sin \alpha \cos m) = 1 \rightarrow \sin 2m = -\frac{1}{r} \rightarrow \begin{cases} 2m = 2k\pi + \frac{3\pi}{4} \\ 2m = 2k\pi + \pi - \frac{3\pi}{4} \end{cases}$$

$$m = k\pi + \frac{3\pi}{8} \xrightarrow{[0, 2\pi]} \frac{3\pi}{8}, \frac{11\pi}{8}$$

$$m = k\pi + \frac{5\pi}{8} \xrightarrow{[0, 2\pi]} \frac{5\pi}{8}, \frac{13\pi}{8}$$

$$(1 + \cos 2\alpha)(1 + \cos 4\alpha)(1 + \cos 8\alpha) = \frac{1}{\Lambda} \quad (1, 5) \quad -9$$

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

$$\cos \alpha \cos 2\alpha \cos 4\alpha = \frac{1}{\sqrt{\Lambda}} \times \sin 2\alpha \cos 2\alpha \cos 4\alpha = \frac{1}{\sqrt{\Lambda}} \sin 4\alpha \cos 4\alpha$$

$$= \frac{1}{\sqrt{\Lambda}} \sin 8\alpha = \frac{1}{\sqrt{\Lambda}} \rightarrow \sin 8\alpha = 1 \rightarrow 8\alpha = 2k\pi + \frac{\pi}{2}$$

$$\alpha = \frac{k\pi}{8} + \frac{\pi}{14} \quad \text{Unit Circle Diagram} \rightarrow \frac{5\pi}{8} + \frac{\pi}{14} = \frac{39\pi}{56}$$

$$\tan^2 m = \frac{1}{\tan^2 n} = \cot^2 n = \tan^2\left(\frac{\pi}{2} - n\right) \rightarrow m = k\pi + \frac{\pi}{2} - n \quad 10$$

$$\rightarrow m = k\pi + \frac{\pi}{2} \rightarrow n = \frac{k\pi}{2} + \frac{\pi}{2} \quad \begin{array}{c|c|c|c|c} k & \pi & 2\pi & 3\pi & 4\pi \\ \hline n & \frac{3\pi}{2} & \frac{5\pi}{2} & \frac{7\pi}{2} & \frac{9\pi}{2} \end{array}$$

Unit Circle Diagram $\sum = 4\pi$ ✓

$$\cos^2 m = \cos^2 \frac{m}{2} = 1 \quad (\text{فرمول ضلعي}) \quad -10$$

$$\Delta \sin^2 n + 2\left(\cos^2 \frac{m}{2} - 1\right) = -2 \rightarrow \Delta \sin^2 n + \cos^2 \frac{m}{2} - 2 = -2$$

حاصل جمع دو عدد نامفهوم صفر است پس هر دو صفر بوده اند!

$$\Delta \sin^2 n = 0 \rightarrow \sin n = 0 \rightarrow n = k\pi \xrightarrow{-\pi \leq n \leq \pi} n = \pi, 0, -\pi$$

$$\cos^2 \frac{m}{2} = 0 \rightarrow \cos \frac{m}{2} = 0 \rightarrow \frac{m}{2} = k\pi + \frac{\pi}{2} \rightarrow m = \frac{2k\pi + \pi}{2}$$

$$\xrightarrow{-\pi \leq n \leq \pi} n = -\pi, -\frac{\pi}{2}, \frac{\pi}{2}, \pi$$

انتخاب دو عدد جواب $\{ \pi, -\pi \}$ است

(4)

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

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

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

$$x = k\pi + \frac{\pi}{4} \xrightarrow{0 \leq x < 2\pi} k=0 \rightarrow x = \frac{\pi}{4}, \quad k=1, x = \frac{5\pi}{4}$$

مصاد ۲ جواب در بازه دارد

(9)

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

$$\begin{cases} 1 + \cos 2x = 2 \cos^2 x \\ 1 + \cos 4x = 2 \cos^2 2x \\ 1 + \cos 8x = 2 \cos^2 4x \end{cases} \rightarrow \Delta \cos^2 x \cos^2 2x \cos^2 4x = \frac{1}{\Delta}$$

$$\cos^2 x \cos^2 2x \cos^2 4x = \frac{1}{4\Delta} \xrightarrow{\sqrt{\quad}} \cos x \cos 2x \cos 4x = \pm \frac{1}{\Delta} \xrightarrow{\times \sin x} \sin x \cos x \cos 2x \cos 4x = \pm \frac{\sin x}{\Delta}$$

$$\underbrace{(\sin x \cos x)}_{\sin 2x} \cos 2x \cos 4x = \pm \frac{\sin x}{\Delta} \rightarrow \frac{1}{\Delta} \underbrace{(\sin 2x \cos 2x)}_{\frac{1}{2} \sin 4x} \cos 4x = \pm \frac{\sin x}{\Delta}$$

$$\frac{1}{\Delta} \times \frac{1}{\Delta} \underbrace{(\sin 4x \cos 4x)}_{\sin 8x} = \pm \frac{\sin x}{\Delta} \rightarrow \frac{1}{\Delta} \sin 8x = \pm \frac{\sin x}{\Delta}$$

$$\sin 8x = \pm \sin x \rightarrow \begin{cases} 8x = 2k\pi + x \leq 2k\pi + \pi - x \\ 8x = 2k\pi - x \leq 2k\pi + \pi + x \end{cases}$$

$$x = \frac{2k\pi}{7} \xrightarrow{MANA} k=3 \rightarrow x = \frac{6\pi}{7}$$

$$x = \frac{2k\pi}{9} \xrightarrow{MANA} k=4 \rightarrow x = \frac{8\pi}{9}$$

$$x = \frac{(2k+1)\pi}{9} \xrightarrow{MANA} k=2 \rightarrow x = \frac{5\pi}{9}$$

$$x = \frac{(2k+1)\pi}{9} \xrightarrow{MANA} k=3 \rightarrow x = \frac{7\pi}{9}$$

$$\rightarrow MANA = \frac{8\pi}{9}$$

★ A نمی تواند برابر خود π باشد چون $\sin x \neq \sin \pi$ / مخالف صفر در قعر لولفته ایم!