

شماره ۱

$$A \cos x - \tan^2 x = 1 \rightarrow A \cos x = 1 + \tan^2 x$$

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

$$\cos^2 x = \frac{1}{A} \quad \cos x = \pm \frac{1}{\sqrt{A}}$$

بنا بر $\cos x = \frac{1}{\sqrt{A}}$

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

شماره ۲

$$\omega \sin^2 x + 2 \cos^2(x) = -5 \rightarrow A \cos^2 x - \omega \cos^2 x - 4 \cos^2 x + 4 = 0$$

دایره واحد

$$\begin{cases} 0 \rightarrow \cos x = 1 \rightarrow A - \omega - 4 + 4 = 0 \text{ غلط} \\ \frac{\pi}{2} \rightarrow \cos \frac{\pi}{2} = 0 \rightarrow 0 - 0 - 0 + 4 = 4 \text{ غلط} \\ \pi \rightarrow \cos \pi = -1 \rightarrow -A - \omega + 4 + 4 = 0 \text{ صحیح} \\ \frac{3\pi}{2} \rightarrow \cos \frac{3\pi}{2} = 0 \rightarrow 0 - 0 - 0 + 4 = 4 \text{ غلط} \end{cases}$$

دایره واحد: $x \in [-\pi, \pi]$

شماره ۳

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

$$r \sin x - \sin^3 x = 1 \rightarrow \sin^3 x = r \sin x - 1 \rightarrow \sin^2 x = \frac{r \sin x - 1}{\sin x}$$

$k = -1 \rightarrow \frac{-\pi}{2}$
 $k = 0 \rightarrow \frac{\pi}{2}$
 $k \geq 1 \rightarrow \frac{2\pi}{3}$
 $k \geq 2 \rightarrow \frac{4\pi}{3}$

$$\rightarrow \frac{\pi}{4} + \frac{\omega\pi}{4} + \frac{3\pi}{4} = \frac{\omega\pi}{4}$$

شماره ۴

$$\frac{1}{\sin(\frac{\pi + \varepsilon x}{r})} + \frac{1}{\cos(\frac{\pi + \omega x}{r})} = 0 \rightarrow \frac{1}{\cos 2x} + \frac{1}{r \sin x \cos x} = \frac{1}{\cos 2x} \left(\frac{r \sin 2x - 1}{r \sin 2x} \right) = 0$$

$$\sin(\frac{\pi + \varepsilon x}{r}) = \sin(\frac{\pi}{r} + \frac{\varepsilon x}{r}) = \cos \varepsilon x$$

$\varepsilon \sin 2x = 1$
 $\sin 2x = \frac{1}{\varepsilon}$
 $2x = \frac{\pi}{2} \rightarrow x = \frac{\pi}{4}$
 $2x = \frac{3\pi}{2} \rightarrow x = \frac{3\pi}{4}$

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

$\tan x = \tan \frac{\pi}{4} = 1$
 $\tan x = \tan \frac{3\pi}{4} = -1$

شماره ۵

$$m(\cos x - \sin x) - \sqrt{4} \sin(x) = \sqrt{4}$$

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

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

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

$m \frac{\sqrt{2}}{\sqrt{2}} - \sqrt{4} \times \frac{1}{\sqrt{2}} = \sqrt{4}$
 $m = \frac{2\sqrt{2} \times \sqrt{2}}{\sqrt{2}} = 4$

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

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

$$\cos\left(n - \frac{\pi}{4}\right) = \pm 1 \rightarrow n - \frac{\pi}{4} = k\pi \xrightarrow{[1, 2\pi]} \left\{ \frac{\pi}{4}, \frac{5\pi}{4} \right\}$$

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

$$\sin n + \sqrt{2} \cos n = \sqrt{2} \rightarrow \sin n \times \frac{1}{\sqrt{2}} + \cos n \times \frac{\sqrt{2}}{\sqrt{2}} = \frac{\sqrt{2}}{\sqrt{2}} \rightarrow \sin n \cos \frac{\pi}{4} + \cos n \sin \frac{\pi}{4} = \sin \frac{\pi}{4}$$

$$\rightarrow \sin\left(n + \frac{\pi}{4}\right) = \sin \frac{\pi}{4} \rightarrow n + \frac{\pi}{4} = 2k\pi + \frac{\pi}{4} \rightarrow n = 2k\pi \xrightarrow{[-\pi, \pi]} \frac{\pi}{12}, \frac{5\pi}{12}$$

$$n + \frac{\pi}{4} = 2k\pi + \pi - \frac{\pi}{4} \Rightarrow n = 2k\pi + \frac{3\pi}{2} \xrightarrow{[-\pi, \pi]} \frac{3\pi}{2}$$

$$\rightarrow \frac{\pi}{12} + \frac{5\pi}{12} + \frac{3\pi}{2} = \frac{12\pi}{12} = \pi$$

$$\sin n \sin\left(\frac{5\pi}{4} - n\right) = 1 \rightarrow -\sin n \cos n = 1 \rightarrow -\sin 2n = 1$$

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

$$\sin 2n \Rightarrow \sin \frac{7\pi}{6} \rightarrow 2n = 2k\pi + \frac{7\pi}{6} \rightarrow n = k\pi + \frac{7\pi}{12}$$

$$n = k\pi - \frac{7\pi}{12} \rightarrow n = \frac{11\pi}{12}, \frac{5\pi}{12}$$

$$n = k\pi + \frac{7\pi}{12} \rightarrow n = \frac{19\pi}{12}, \frac{25\pi}{12}$$

$$\rightarrow \frac{11\pi}{12} + \frac{5\pi}{12} + \frac{19\pi}{12} + \frac{25\pi}{12} = 2\pi$$

$$(1 + \cos 2\alpha)(1 + \cos 4\alpha)(1 + \cos 8\alpha) = \frac{1}{\Lambda} \xrightarrow{\frac{\Lambda}{\sin \alpha} \times \frac{1}{\sin \alpha}} \frac{\Lambda}{\sin \alpha} \left(\frac{1}{2} \sin 2\alpha \cos 2\alpha \dots \right) = \frac{1}{\Lambda}$$

$$\frac{\Lambda}{\sin \alpha} \left(\frac{1}{2} \sin 2\alpha \cos 2\alpha \dots \right) \Rightarrow \frac{\Lambda}{\sin \alpha} \left(\frac{1}{4} \sin 4\alpha \cos 4\alpha \right) = \frac{1}{\Lambda}$$

$$\frac{\Lambda}{\sin \alpha} \times \frac{1}{4} \sin 4\alpha = \frac{1}{\Lambda} \rightarrow \sin 4\alpha = \sin \alpha \rightarrow \sin 4\alpha = \pm \sin \alpha$$

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

$$\Lambda\alpha = 2k\pi + \pi - \alpha \Rightarrow \alpha = \frac{2k\pi}{\Lambda} + \frac{\pi}{\Lambda}$$

$$\Lambda\alpha = 2k\pi - \alpha \Rightarrow \alpha = \frac{2k\pi}{\Lambda}$$

$$\Lambda\alpha = 2k\pi + \pi + \alpha \Rightarrow \alpha = \frac{2k\pi}{\Lambda} + \frac{\pi}{\Lambda}$$

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

$$\tan n = \tan\left(\frac{\pi}{4} - n\right)$$

$$n = k\pi + \frac{\pi}{4} - n \rightarrow n = \frac{k\pi}{2} + \frac{\pi}{8}$$

$$\xrightarrow{[0, 2\pi]} \frac{5\pi}{8} + \frac{\pi}{8} = \frac{6\pi}{8} = \frac{3\pi}{4}$$