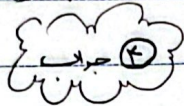


رئیس دبیران

$$\textcircled{1} \quad \sec x - \tan^2 x = 1 \quad [0, 2\pi]$$

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



توان 3

$$\cos x = 1$$

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

1, 17, 5

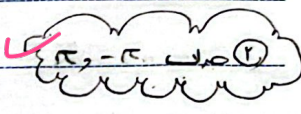
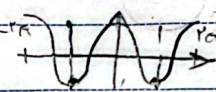
$$\textcircled{2} \quad \Delta \sin^2 x + 2 \cos^2 x = -2$$

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

$$\Delta - \Delta \cos^2 x + 2 \cos^2 x = -2 \xrightarrow{\cos x = a} \Delta - \Delta a^2 + 2a^2 = -2$$

$$\Delta a^2 - \Delta a^2 - 4a + 2a^2 = -2 \xrightarrow{\Delta a^2 - \Delta a^2} \Delta a^2 - 4a + 2a^2 = -2$$

$$(a+1)(\Delta a^2 - 4a + 2) = 0$$



$$\textcircled{3} \quad 2 \sin x \cos x + \sin x = 1 \quad [0, 2\pi]$$

$$2 \sin^2 x = 1 - \cos^2 x$$

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

$$2 \sin x - 2 \sin^3 x - 1 = 0$$

$$2 \sin^3 x - 2 \sin x + 1 = 0 \quad \Delta \pm \sqrt{4 - 4} = 0$$

$$\sin x = 1$$

$$\textcircled{4} \quad \frac{1}{\sin(\frac{\pi}{4} + \frac{\pi}{4})} + \frac{1}{\cos(\frac{\pi}{4} + \frac{\pi}{4})} = 0 \quad x_1 - x_2 = \alpha \quad [0, \alpha] \quad \tan \alpha = ?$$

$$\frac{1}{\sin(\frac{\pi}{4} + \frac{\pi}{4})} + \frac{1}{\cos(\frac{\pi}{4} + \frac{\pi}{4})} = 0 \quad \frac{1}{\cos \frac{\pi}{4}} + \frac{1}{-\sin \frac{\pi}{4}} = 0$$



$$\cos \frac{\pi}{4} - \sin \frac{\pi}{4} = 0 \quad \sin \frac{\pi}{4} = \cos \frac{\pi}{4} \quad \sin \frac{\pi}{4} = \sin(\frac{\pi}{4} - \frac{\pi}{4}) \rightarrow \frac{\pi}{4} = k\pi + \frac{\pi}{4} - \frac{\pi}{4}$$

$$\textcircled{5} \quad m(\cos x - \sin x) - 2\sqrt{2} \sin x = \sqrt{2} \quad \cos x \cos \frac{\pi}{4} - \sin x \sin \frac{\pi}{4} = \frac{1}{\sqrt{2}}$$

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

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

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

$$\cos x - \sin x = \frac{\sqrt{2}}{2} \rightarrow \cos x - \sin x = \frac{\sqrt{2}}{2}$$

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

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

$$\frac{\sqrt{2}}{2}m - \sqrt{2} = \sqrt{2} \rightarrow \frac{m\sqrt{2}}{2} = 2\sqrt{2} \rightarrow m = 4$$

1, 17, 5

④ $\sin(n + \frac{\pi}{4}) \cos(n - \frac{\pi}{4}) = 1$ $[0, 2\pi]$

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

$(\frac{\sqrt{2}}{2} \sin n + \frac{1}{2} \cos n)(\frac{1}{2} \cos n + \frac{\sqrt{2}}{2} \sin n) = 1$

$\rightarrow \sin(n + \frac{\pi}{4}) = 1$ $x + \frac{\pi}{4} = 2k\pi + \frac{\pi}{4} \rightarrow y_n + \alpha = 2k\pi + \frac{\pi}{4} \rightarrow y_n = 2k\pi + \frac{\pi}{4}$

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

$\rightarrow \sin(n + \frac{\pi}{4}) = -1$ $x + \frac{\pi}{4} = 2k\pi - \frac{\pi}{4} \rightarrow y_n + \alpha = 2k\pi - \frac{\pi}{4} \rightarrow y_n = 2k\pi - \frac{\pi}{4}$

$n = \frac{2k\pi}{4}$

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

1/0

$[-\pi, \pi]$ ⑤ $\sin n + \sqrt{2} \cos n = \sqrt{2}$ $r(\frac{1}{r} \sin n + \frac{\sqrt{2}}{r} \cos n) = \sqrt{2} \rightarrow \sin(n + \frac{\pi}{4}) = \frac{\sqrt{2}}{r}$

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

$\frac{-\pi}{4}$ $\frac{2k\pi}{4}$

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

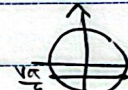
$\frac{-19\pi}{4}$ $\frac{\pi}{4}$

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

$\frac{19\pi}{4} = \frac{19\pi}{4}$

$\frac{19\pi}{4} = \frac{19\pi}{4}$

⑥ $\sin n \cos n = 1$ $\rightarrow \sin 2n = 1$



$\rightarrow 2n = \frac{\pi}{2}$ $n = \frac{\pi}{4}$

⑦ $(\cos n)(\cos n)(\cos n) = \frac{1}{\sqrt{2}}$

$\frac{\cos n}{\frac{1}{\sqrt{2}}} = \frac{1}{\sqrt{2}}$ $\rightarrow \cos n = \frac{1}{2}$ $n = \frac{\pi}{3}$ $\rightarrow 3n = \frac{\pi}{3} + 2k\pi$ $\rightarrow n = \frac{\pi}{9} + \frac{2k\pi}{3}$

$\rightarrow \sin n = \frac{1}{2}$ $n = \frac{\pi}{6}$ $\rightarrow 3n = \frac{\pi}{6} + 2k\pi$ $\rightarrow n = \frac{\pi}{18} + \frac{2k\pi}{3}$

$\rightarrow \sin n = -\frac{1}{2}$ $n = \frac{7\pi}{6}$ $\rightarrow 3n = \frac{7\pi}{6} + 2k\pi$ $\rightarrow n = \frac{7\pi}{18} + \frac{2k\pi}{3}$

$\frac{19\pi}{18}$

⑧ $\tan n = \cot n \rightarrow \tan n = \tan(\frac{\pi}{2} - n)$ $n = \frac{\pi}{4} + \frac{\pi}{2} - n$ $\rightarrow 2n = \frac{3\pi}{4}$ $\rightarrow n = \frac{3\pi}{8}$

$\frac{\pi}{4}$ $\frac{3\pi}{8}$ $\frac{5\pi}{8}$ $\frac{7\pi}{8}$ $\frac{9\pi}{8}$ $\frac{11\pi}{8}$ $\frac{13\pi}{8}$ $\frac{15\pi}{8}$

1/0

$$\cos 2x = 1 - 2 \sin^2 x \quad (\text{فرمول ظاهری})$$

$$2 \sin x (1 - 2 \sin^2 x) + \sin x = 1 \rightarrow 2 \sin x - 4 \sin^3 x = 1$$

$$\sin 3x = 1 \rightarrow 3x = 2k\pi + \frac{\pi}{2} \rightarrow x = \frac{2k\pi}{3} + \frac{\pi}{6} \quad \xrightarrow{0 \leq x \leq 2\pi}$$

$$k=0 \rightarrow x = \frac{\pi}{6}, \quad k=1 \rightarrow x = \frac{5\pi}{6}, \quad k=2 \rightarrow x = \frac{9\pi}{6}$$

$$S = \frac{\pi}{6} + \frac{5\pi}{6} + \frac{9\pi}{6} = \frac{15\pi}{6} = \boxed{\frac{5\pi}{2}}$$

عبارت را $\frac{1}{r}$ ضرب می‌کنیم. (۷)

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

$$\cos 4^\circ \sin x + \sin 4^\circ \cos x = \sqrt{\frac{r}{r}} \rightarrow \sin(x + \frac{\pi}{4}) = \sqrt{\frac{r}{r}}$$

$$x + \frac{\pi}{4} = 2k\pi + \frac{\pi}{2} \rightarrow x = 2k\pi - \frac{\pi}{4} \xrightarrow{-\pi \leq x \leq \pi} k=0, 1 \rightarrow x = -\frac{\pi}{4}, \frac{7\pi}{4}$$

$$x + \frac{\pi}{4} = 2k\pi + \frac{3\pi}{2} \rightarrow x = 2k\pi + \frac{5\pi}{4} \xrightarrow{-\pi \leq x \leq \pi} k=0 \rightarrow x = \frac{5\pi}{4}$$

$$S = \frac{7\pi}{4} - \frac{\pi}{4} + \frac{5\pi}{4} = \frac{11\pi}{4} = \boxed{\frac{11\pi}{4}}$$

$$\tan 3x = \frac{1}{\tan x} = \cot x \rightarrow \tan 3x = \tan(\frac{\pi}{2} - x) \quad (10)$$

$$3x = k\pi + \frac{\pi}{2} - x \rightarrow 4x = k\pi + \frac{\pi}{2} \rightarrow x = \frac{k\pi}{4} + \frac{\pi}{8}$$

k	۴	۵	۶	۷
x	$\frac{9\pi}{8}$	$\frac{11\pi}{8}$	$\frac{13\pi}{8}$	$\frac{15\pi}{8}$

$$S = (\frac{9+11+13+15}{8})\pi = \frac{48\pi}{8} = \boxed{6\pi}$$