

تکلیف W

(فازدهم April صبح)

مریم شکرگی

$$1 \cos \theta - \tan^2 \theta = 1 \quad [0, \pi]$$

سوال (1) ۲. انتخاب بدست

$$1 \cos \theta = \tan^2 \theta + 1$$

ضریب یکی نوشته بودی معذور

$$\frac{\sin^2 \theta}{\cos^2 \theta} + 1 = \frac{\sin^2 \theta + \cos^2 \theta}{\cos^2 \theta} = \frac{1}{\cos^2 \theta}$$

$$\rightarrow 1 \cos \theta = \frac{1}{\cos^2 \theta} \rightarrow \cos^3 \theta = \frac{1}{1} \rightarrow \cos \theta = \frac{1}{1}$$

$$\cos \theta = \frac{1}{1} \rightarrow \theta \in [0, \pi] \rightarrow \theta = \frac{\pi}{3} \text{ و } \frac{5\pi}{3} \rightarrow \boxed{2 \text{ جواب}}$$

$$2 \sin^2 \theta + 5 \cos^2 \theta = -2 \quad [-\pi, \pi]$$

سوال (2)

$$\sin^2 \theta = 1 - \cos^2 \theta, \quad \cos^2 \theta = 1 - \sin^2 \theta$$

$$\rightarrow 1 \cos^2 \theta - 4 \cos \theta - 2 \cos^2 \theta + 1 = 0$$

بررسی نقطه اصلی:

$$\theta = 0 \rightarrow 1 - 4 - 2 + 1 \neq 0 \quad \times$$

$$\theta = \frac{\pi}{2} \rightarrow 0 + 0 + 0 + 1 \neq 0 \quad \times \rightarrow \theta = \frac{3\pi}{2}$$

$$\theta = \pi \rightarrow -1 + 4 - 2 + 1 = 0 \quad \checkmark \rightarrow \theta \in [0, \pi] \text{ و } \frac{5\pi}{3}$$

$$\rightarrow \text{جواب ها} = \pi \text{ و } -\pi \rightarrow \boxed{2}$$

تایید

$$r \sin \alpha \cos \theta + \sin \alpha = 1 \quad [0, 2\pi] \quad (\text{سوال ۳})$$

$$\rightarrow \sin \alpha (r \cos \theta + 1) = 1 \quad \cos \theta = 1 - r \sin^2 \alpha \quad \sin \alpha (r - r \sin^2 \alpha) = 1$$

$$\rightarrow r \sin \alpha - r \sin^3 \alpha = 1 \rightarrow \sin^2 \alpha = 1 \rightarrow \theta \in \theta + \pi$$

$$\rightarrow \alpha \in \frac{\pi}{2} + \frac{\pi}{4} \rightarrow \begin{matrix} \frac{\pi}{4} \\ \frac{5\pi}{4} \\ \frac{3\pi}{2} \end{matrix} \rightarrow \text{صبر} = \frac{2\pi}{2}$$

$$\frac{1}{\sin(\frac{\pi}{2} + \epsilon \pi)} + \frac{1}{\cos(\frac{\pi}{2} + \epsilon \pi)} = \tan \alpha = 5 \quad (\text{سوال ۴})$$

$$\rightarrow \sin(\frac{\pi}{2} + \epsilon \pi) = -\cos(\frac{\pi}{2} + \epsilon \pi) \rightarrow \cos \theta = \sin \epsilon \pi$$

$$\rightarrow \cos \theta = r \sin \theta \cos \theta \quad \cos \theta \neq 0 \rightarrow r \sin \theta = 1 \rightarrow \sin \theta = \frac{1}{r}$$

$$\theta \in \theta + \frac{\pi}{4} \rightarrow \theta + \frac{5\pi}{4}$$

$$\theta \in \theta + \frac{\pi}{12}$$

$$\theta \in \theta + \frac{5\pi}{12}$$

$$\frac{5\pi}{12} \rightarrow \frac{\pi}{12} = \frac{\pi}{6}$$

$$\alpha = \frac{\pi}{6} \rightarrow r \alpha = \frac{\pi}{6}$$

$$\tan \frac{\pi}{6} = \frac{-\frac{1}{\sqrt{3}}}{\frac{1}{2}} = -\sqrt{3}$$

(سوال ۵)

$$m(\cos \alpha - \sin \alpha) - \sqrt{2} \sin \theta = \sqrt{2} \quad \cos(\theta + \frac{\pi}{2}) = \frac{1}{\sqrt{2}} \quad m = 5$$

$$-(\sin \theta - \cos \theta) = -\sqrt{2} \sin(\theta - \frac{\pi}{2}) = \sqrt{2} \sin(\frac{\pi}{2} - \theta)$$

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

* ایا به طور صریح

آپادانا

$$\cos\left(n + \frac{\pi}{4}\right) = \frac{1}{\sqrt{2}} \Rightarrow \cos \alpha = \frac{1}{\sqrt{2}} \Rightarrow \cos 2\alpha = 2\cos^2 \alpha - 1$$

$$\Rightarrow \cos 2\alpha = \frac{2}{2} - 1 = -\frac{1}{2} \rightarrow \cos\left(2m + \frac{\pi}{2}\right) = -\frac{1}{2} \rightarrow -\sin 2m = -\frac{1}{2}$$

$$\Rightarrow \sin 2m = \frac{1}{2}$$

$$\text{مثلاً} \rightarrow m\left(\frac{\sqrt{2}}{\sqrt{2}}\right) - \sqrt{2} \times \frac{1}{2} = \sqrt{2} \Rightarrow \frac{m\sqrt{2}}{\sqrt{2}} = \frac{2\sqrt{2}}{2\sqrt{2}}$$

$$\Rightarrow \boxed{m=2}$$

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

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

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

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

$$\rightarrow n + \frac{\pi}{4} = k\pi + \frac{\pi}{4} \rightarrow n = k\pi \rightarrow \frac{\pi}{4}, \frac{5\pi}{4} \quad \left\{ \begin{array}{l} \text{بجای} \\ n = k\pi - \frac{\pi}{4} \rightarrow \frac{\pi}{4}, \frac{7\pi}{4} \end{array} \right\}$$

$$\sin n + \sqrt{2} \cos n = \sqrt{2} \quad [-\pi, 2\pi] \quad (4 \text{ دوال})$$

$$\rightarrow \frac{1}{2} \times \sin n + \frac{\sqrt{2}}{2} \times \cos n = \frac{\sqrt{2}}{2} \Rightarrow \sin\left(n + \frac{\pi}{4}\right) = \sin\left(\frac{\pi}{4}\right)$$

$$\rightarrow n + \frac{\pi}{4} = 2k\pi + \frac{\pi}{4} \rightarrow n = 2k\pi \rightarrow -\frac{\pi}{4}, \frac{7\pi}{4}$$

$$\rightarrow n + \frac{\pi}{4} = 2k\pi + \frac{3\pi}{4} \rightarrow n = 2k\pi + \frac{\pi}{2} \rightarrow \frac{\pi}{2}, \frac{5\pi}{2}$$

$$\Rightarrow \boxed{\frac{9\pi}{4} \text{ مجموع}}$$

$$r \sin \alpha \sin \left(\frac{2\pi}{r} - \alpha \right) = 1 \quad [0, \pi] \quad (\text{سوال 8})$$

$$\downarrow$$

$$- \cos \alpha$$

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

$$\rightarrow 2\alpha \in \left[\frac{\pi}{2}, \frac{3\pi}{2} \right] \rightarrow \alpha \in \left[\frac{\pi}{4}, \frac{3\pi}{4} \right] \rightarrow \frac{11\pi}{12}, \frac{13\pi}{12}$$

$$\downarrow \rightarrow 2\alpha \in \left[\frac{5\pi}{4}, \frac{7\pi}{4} \right] \rightarrow \alpha \in \left[\frac{5\pi}{8}, \frac{7\pi}{8} \right] \rightarrow \frac{5\pi}{8}, \frac{7\pi}{8}$$

$$\rightarrow \boxed{\text{مجموع} = 2\pi}$$

$$(1 + \cos 2\alpha)(1 + \cos 4\alpha)(1 + \cos 8\alpha) = \frac{1}{\lambda} \quad [0, \pi] \quad (\text{سوال 9})$$

$$\begin{aligned} \cancel{\sin^2 \alpha} + \cos^2 \alpha + \cos^2 \alpha - \cancel{\sin^2 \alpha} \\ = r \cos^2 \alpha \end{aligned}$$

$$\rightarrow (r \cos^2 \alpha)(r \cos^2 \alpha)(r \cos^2 \alpha) = \frac{1}{\lambda}$$

$$\rightarrow \cos^2 \alpha \cos^2 \alpha \cos^2 \alpha = \frac{1}{4\lambda} \rightarrow \cos \alpha \cos 2\alpha \cos 4\alpha = \pm \frac{1}{\lambda}$$

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

$$\rightarrow \sin 4\alpha = \sin \alpha \rightarrow 4\alpha = 2k\pi + \alpha \rightarrow \alpha = \frac{2k\pi}{3}$$

$$\downarrow \sin 4\alpha = \sin -\alpha \rightarrow 4\alpha = 2k\pi + \pi - \alpha \rightarrow \alpha = \frac{2k\pi}{5} + \frac{\pi}{5}$$

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

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

$$\rightarrow \max_{\alpha \in [0, \pi]} = \boxed{\frac{4\pi}{3}}$$

$$\tan \theta_n \tan \theta = 1 \quad [\theta, \theta_n]$$

(1-0.5)

$$\tan \theta_n = \frac{1}{\tan \theta} \rightarrow \cot \theta_n = \tan \theta \rightarrow \text{if } \theta_n = \theta \rightarrow \cot \theta_n = \tan(\frac{\pi}{2} - \theta_n)$$

(2)

$$\rightarrow \tan \theta = \tan(\frac{\pi}{2} - \theta_n) \rightarrow \theta \in \frac{\pi}{2} + \theta_n - \theta_n \rightarrow \theta \in \frac{\pi}{2} + \theta_n$$

$$\theta = \frac{9\pi}{\lambda}, \frac{11\pi}{\lambda}, \frac{13\pi}{\lambda}, \frac{15\pi}{\lambda}$$

$$\rightarrow \theta_{\text{max}} = \frac{9\pi}{\lambda}$$