آیلا فروتنا   ۱۸,۷۵ با دقت جزئیات و صورت سوالها رو بخوان !

۱. $\wedge\cos x - \tan^2 x = 1 \longrightarrow \wedge\cos x = 1 + \tan^2 x \longrightarrow \wedge\cos x = \dfrac{1}{\cos^2 x}$

$\xrightarrow{\times \cos^2 x} \wedge\cos^3 x = 1 \longrightarrow \cos^3 x = \dfrac{1}{\wedge} \longrightarrow \cos x = \dfrac{1}{\gamma} \left\{ \begin{array}{c} \dfrac{\pi}{\gamma} \\ or \\ \dfrac{\wedge\pi}{\gamma} \end{array} \right\}$ جواب   ②

۲. $\delta\sin^2 x + \gamma\cos^2 x = \gamma \longrightarrow \sin^2 x = 1 - \cos^2 x / \cos^2 x , \gamma\cos^2 x , \gamma\cos x$

$\delta - \delta\cos^2 x + \gamma\cos^2 x - \gamma\cos x = \gamma \longrightarrow \wedge\cos^2 x - \delta\cos^2 x - \gamma\cos x + \gamma = 0$

$\cdot 0 \longrightarrow \wedge - \delta - \gamma + \gamma = \gamma \neq 0$ ④

$\xrightarrow{\quad} \dfrac{\pi}{\gamma} \longrightarrow \gamma \neq 0$

$\xrightarrow{\quad} \pi \longrightarrow -\wedge - \delta + \gamma + \gamma = 0 \checkmark \longrightarrow \pi$ و $-\pi$: جواب

$\xrightarrow{\quad} \dfrac{-\pi}{\gamma} \longrightarrow \gamma \neq 0$

$\xrightarrow{\quad} -\pi \longrightarrow -\wedge - \delta + \gamma + \gamma = 0 \checkmark$

۳. $\sin x (\gamma\cos^2 x + 1) = 1 \longrightarrow \gamma\sin x - \gamma\sin^3 x + \sin x = 1$ ⑤,۱.
$\underbrace{}_{1 - \gamma\sin^2 x}$

$\gamma\sin x - \gamma\sin^3 x = 1 \longrightarrow \sin^3 x = 1 \longrightarrow \gamma x = \gamma k\pi + \dfrac{\pi}{\gamma} \longrightarrow x = \dfrac{\gamma k\pi}{\gamma} + \dfrac{\pi}{\gamma}$

$\left. \begin{array}{c} \dfrac{\pi}{\gamma} \\ \dfrac{\delta\pi}{\gamma} \\ \dfrac{q\pi}{\gamma} = \dfrac{\gamma\pi}{\gamma} \end{array} \right\}$ جواب مجموع ؟

$\boxed{\dfrac{\pi}{\gamma} + \dfrac{\delta\pi}{\gamma} + \dfrac{q\pi}{\gamma} = \dfrac{\gamma\delta\pi}{\gamma} = \dfrac{\delta\pi}{\gamma}}$

$$\sin\left(\frac{\pi + 6x}{2}\right) = \sin\left(2x + \frac{\pi}{2}\right) = \cos 2x$$

۲.

$$\frac{1}{-2\sin 2x \cos 2x} + \frac{1}{\cos 2x} = 0 \to \frac{1}{\cos\left(\frac{\pi + 4x}{2}\right)} + \frac{1}{\sin\left(\frac{\pi + 6x}{2}\right)}$$ (۲)

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

$$= \frac{1}{\cos 2x}\left(\frac{2\sin 2x - 1}{2\sin 2x}\right) = 0$$

$$\underbrace{2\sin 2x = 1}$$

$$\sin 2x = \frac{1}{2} \quad\nearrow\quad 2x = \frac{\pi}{4} \to x = \frac{\pi}{12} \quad\longrightarrow\quad \frac{5\pi}{12} - \frac{\pi}{12} = \frac{4\pi}{12} = \frac{\pi}{12}\Bigg\}_{\alpha}$$
$$\qquad\qquad\searrow\quad 2x = \frac{5\pi}{4} \to x = \frac{5\pi}{12}$$

$$\tan 2\alpha = \tan\frac{2\pi}{3} = -\sqrt{3} \checkmark$$

۵.

$$m(\cos x - \sin x) = 2\sqrt{3}\sin\left(2x\right) = \sqrt{4}$$

$$\cos x - \sin x = -(\sin x - \cos x) = -\sqrt{2}\sin\left(x - \frac{\pi}{4}\right) = \sqrt{2}\sin\left(\frac{\pi}{4} - x\right)$$ (۲)

$$= \sqrt{2}\cos\left(\frac{\pi}{4} + x\right) = \sqrt{2} \times \frac{1}{\sqrt{3}} = \frac{\sqrt{2}}{\sqrt{3}}$$

$$\cos\left(x + \frac{\pi}{4}\right) = \frac{1}{\sqrt{3}} \quad \cos x = \frac{1}{\sqrt{3}} \longrightarrow \cos 2x = 2\cos^2 x - 1 \quad \cos^2 x = \frac{1}{3} \quad x = \frac{1}{3} - 1 = \frac{-1}{3}$$

$$\longrightarrow \cos\left(2x + \frac{\pi}{2}\right) = \frac{-1}{3} \quad \sin 2x = \frac{-1}{3} \longrightarrow \sin 2x = \frac{1}{3}$$

$$m \times \frac{\sqrt{2}}{\sqrt{3}} = 2\sqrt{4} \times \frac{1}{3} = \sqrt{4} \longrightarrow m \times \frac{\sqrt{2}}{\sqrt{3}} = 2\sqrt{4}$$

$$\frac{m\sqrt{4}}{3} = 2\sqrt{4} \longrightarrow m\sqrt{4} = 4\sqrt{4} \longrightarrow m = 4 \checkmark$$

آیدا فیروزنیا

۴

$$\sin(x + \tfrac{\pi}{4})\,\cos(x - \tfrac{\pi}{4}) = 1 \to x \cos(x - \tfrac{\pi}{2}) = 1$$

(١/٧٥)

$$\to \cos(x - \tfrac{\pi}{2}) = \tfrac{1}{2} \to x - \tfrac{\pi}{2} \to \tfrac{\pi}{3} \to x = \tfrac{\Delta\pi}{۶}$$

$$\cos(n - \tfrac{\pi}{۲}) = \pm 1 \qquad \tfrac{۵\pi}{۳} \to x = \tfrac{۲\pi}{۳} \Big\} \text{ رد میشه }$$

$$n - \tfrac{\pi}{۲} = k\pi \longrightarrow n = k\pi + \tfrac{\pi}{۲} \qquad x = 0$$

$$k = 0 \text{ و } 1 \longrightarrow n = \tfrac{\pi}{۲} \text{ و } \tfrac{۳\pi}{۲} \qquad \bigstar \text{ ۲ جواب}$$

۷.

$$\sin x = \sqrt{۳}\cos x = \sqrt{۳} \to \sin x \tfrac{1}{۲} + \cos x \tfrac{\sqrt{۳}}{۲} = \tfrac{\sqrt{۳}}{۲}$$

$$\sin x \cos\tfrac{\pi}{۳} + \cos x \sin\tfrac{\pi}{۳} = \sin\tfrac{\pi}{۳}$$

(۲)

$$\to \sin(x + \tfrac{\pi}{۳}) = \sin(\tfrac{\pi}{۳}) \to x + \tfrac{\pi}{۳} = ۲k\pi + \tfrac{\pi}{۳} \to x = ۲k\pi - \tfrac{\pi}{۳} \to \tfrac{-\pi}{۱۲} , \tfrac{۲۳\pi}{۱۲}$$

$$x + \tfrac{\pi}{۳} = ۲k\pi + \pi - \tfrac{\pi}{۳} \to x = ۲k\pi + \tfrac{۵\pi}{۳} \to \tfrac{۵\pi}{۱۲}$$

$$\to \tfrac{-\pi}{۱۲} + \tfrac{۲۳\pi}{۱۲} + \tfrac{۵\pi}{۱۲} = \tfrac{۲۷\pi}{۱۲} = \tfrac{۹\pi}{۴}$$

۸.

$$\underbrace{۴\sin x \sin(\tfrac{۳\pi}{۲} - x)}_{-\cos x} = 1 \to -۴\sin x \cos x = 1 \to -۲\sin ۲x = 1$$

$$\sin ۲x = \tfrac{-1}{۲}$$

$$\sin ۲x = \sin\tfrac{-\pi}{۶} \Big\{ ۲x = ۲k\pi - \tfrac{\pi}{۶} \to x = k\pi - \tfrac{\pi}{۱۲}$$

$$۲x = ۲k\pi + \tfrac{۷\pi}{۶} \to x = k\pi + \tfrac{۷\pi}{۱۲}$$

$$\to x = \tfrac{۱۱\pi}{۱۲} , \tfrac{۲۳\pi}{۱۲}$$

$$x = \tfrac{۷\pi}{۱۲} , \tfrac{۱۹\pi}{۱۲} \to \tfrac{۱۱\pi}{۱۲} + \tfrac{۲۳\pi}{۱۲} + \tfrac{۷\pi}{۱۲} + \tfrac{۱۹\pi}{۱۲} = ۵\pi$$

(۲)

9. $(1 + \cos 2\alpha)(1 + \cos 6\alpha)(1 + \cos 8\alpha) = \frac{1}{8}$

$\underbrace{}_{2\cos^2\alpha} \quad \underbrace{}_{2\cos^2 3\alpha} \quad \underbrace{}_{2\cos^2 4\alpha}$

$\dfrac{\times \frac{\sin^2\alpha}{\sin^2\alpha}}{} \to \dfrac{8}{\sin^2\alpha}\left(\underbrace{\sin^2\alpha \, \cos^2\alpha \, \cos^2 3\alpha \, \cos^2 4\alpha}\right) = \frac{1}{8}$

$\underbrace{\frac{1}{4}\sin^2 2\alpha}$

$\frac{1}{4}\sin^2 8\alpha \, -$

$\dfrac{8}{\sin^2\alpha} \times \frac{1}{4\cdot 4}\sin^2 8\alpha = \frac{1}{8} \to \sin^2 8\alpha = \sin^2\alpha \to \sin 8\alpha = \sin\alpha$

$\to 8\alpha = 2k\pi + \alpha \Rightarrow \alpha = \frac{2k\pi}{7}$

$\to 8\alpha = 2k\pi + \pi - \alpha \to \alpha = \frac{2k\pi}{9} + \frac{\pi}{9}$

$\alpha = \frac{2\pi}{7}, \frac{4\pi}{7}, \frac{4\pi}{7}, \frac{\pi}{9}, \frac{3\pi}{9}, \frac{5\pi}{9}, \frac{7\pi}{9}, \frac{4\pi}{9}, \frac{8\pi}{9}$

$, \frac{\pi}{7}, \frac{3\pi}{7}, \frac{5\pi}{7}$

$\overset{max}{}$

10. $\tan(3x)\tan(x) \le 1 \to \tan 3x = \frac{1}{\tan x} = \cot 3x = \tan\left(\frac{\pi}{2} - 3x\right)$

$\tan 3x = \tan\left(\frac{\pi}{2} - 3x\right)$

$3x = k\pi + \frac{\pi}{2} - 3x \to 6x = k\pi + \frac{\pi}{2} \to x = \frac{k\pi}{6} + \frac{\pi}{12} \longrightarrow \frac{3\pi}{8}, \frac{7\pi}{8}, \frac{11\pi}{8}, \frac{15\pi}{12}$

$\tan 3x = \frac{1}{\tan x} = \cot x \longrightarrow \tan 3x = \tan\left(\frac{\pi}{2} - x\right)$

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

n	1	2	3	4
x	$\frac{9\pi}{8}$	$\frac{11\pi}{8}$	$\frac{13\pi}{8}$	$\frac{15\pi}{8}$

$S = \left(\frac{9 \times 119 \cdot 13 \cdot 15}{8}\right)\pi = \frac{64\pi}{8} = \boxed{4\pi}$

$$\cos(x - \frac{\pi}{2}) = \cos(\frac{\pi}{2} - x)$$

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

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

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

معادله ٢ جواب دربازه دارد