

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

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

$2\sin^2 x + 2\sin x - 2 = 0 \rightarrow \sin^2 x + \sin x - 1 = 0$

ب) $2\cos^2 x - 1 + \cos x - 2 = 0$

$2\cos^2 x + \cos x - 2 = 0$

$\cos x = 1$

$\cos x = \frac{1}{2} \rightarrow x = \frac{\pi}{3} + 2k\pi$

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

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

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

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

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

الف) -1

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



$2x = 2k\pi + \frac{11\pi}{4}$

$x = k\pi + \frac{11\pi}{8}$

ب) $2\cos^2 x - 1 = \cos 2x$

$\cos 2x + \sin 2x = 0$

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

$2x = 2k\pi + \pi - 2x - \pi/4$

$4x = 2k\pi + \pi/4$

$\cos 2x = \cos(2x + \pi/4)$

$\cos x = -1 \rightarrow 2k\pi + \pi = x$

$\cos x = 1/2 \rightarrow 2k\pi + \pi/3 = x$

$2k\pi + 5\pi/3$

ب) $\frac{1}{2}(\cos 2x + \cos x) + \frac{\cos 2x - 1}{2} + \cos 2x = 0$

$\cos 2x + \cos x + \cos 2x - 1 + 2\cos 2x = 0$

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

$x = k\pi + \pi/4$

$x = k\pi$

$x = k\pi + \pi/2$

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

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

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

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

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

$\frac{\sin 2x + \sin 4x}{\sin 2x} = 1$

$\frac{\sin 4x}{\sin 2x} + 1 = 1$

$\sin 4x = 0$

$4x = 2k\pi$

$x = k\pi/2$

$x = k\pi + \pi/2$

$x = k\pi + 3\pi/2$

$\sin 2x \neq 0$

$2x \neq 2k\pi$

$x \neq k\pi$

$2x \neq 2k\pi + \pi$

$x \neq k\pi + \pi/2$

$x = k\pi/2$

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

$$\frac{\cos x/y + 1}{\sin x/y} = \frac{\sin x/y}{1 + \cos x/y}$$

$$-\frac{\pi}{y}$$

$$1 + \cos^y \frac{x}{y} = \sin^y \frac{x}{y} \rightarrow 1 - \cos^y \frac{x}{y}$$

$$y \cos^y \frac{x}{y} = 0$$

$$\cos \frac{x}{y} = 0$$

$$\frac{x}{y} = \frac{\pi}{2}$$

$$x = \frac{\pi y}{2}$$

$$x = \frac{4\pi y}{2}$$



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?

$$\sin^y x \cos^y x = \sin^y x \rightarrow 1 = \cos^y x$$



$$2k\pi + \pi = yx$$

$$x = \frac{2k\pi}{y} + \frac{\pi}{y}$$

$$\frac{2k\pi}{y}, \frac{\pi}{y}, \pi, \frac{3\pi}{y}$$

جواب

1, 2, 3

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صورت سوال را با رقت بخوان!

$$\frac{1 - \tan x - 1}{\tan x + 1} = \tan(x - \frac{\pi}{y})$$

$$\tan^y x = \tan(x - \frac{\pi}{y})$$

$$k\pi + x - \frac{\pi}{y} = yx$$

$$\tan x \neq -1$$

صورت سوال

$$x = \frac{k\pi}{y} - \frac{\pi}{y}$$

$$k\pi - \frac{\pi}{y} = yx$$

$$\frac{1 - \tan x}{1 + \tan x} = \tan(\frac{\pi}{2} - x) \rightarrow yx = k\pi + \frac{\pi}{y} - x \rightarrow x = \frac{k\pi}{y} + \frac{\pi}{1y}$$

1, 5

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جواب رابزوی [ن, د] ؟

$$\sqrt{(\sin x + \cos x)^y} = \sqrt{y} (\cos^y x - \sin^y x)$$

$$y \cos^y x = \sin^y x + 1$$

$$y \cos^y x - 1 = \sin^y x \rightarrow \cos^y x = 1$$

$$\sin(x + \frac{\pi}{y}) = \sin^y x$$

$$-x + \frac{\pi}{y} = yx + yk\pi$$

$$-x + \frac{\pi}{y} = yk\pi + \pi - yx$$

$$yk\pi - \frac{\pi}{y} = 2x$$

$$x = \frac{yk\pi}{2} - \frac{\pi}{2y}$$

$$x = k\pi - \frac{\pi}{y}$$

1, 2, 3

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$$a) \frac{\sin^y x - \cos^y x}{1 - \cos^y x} = 1$$

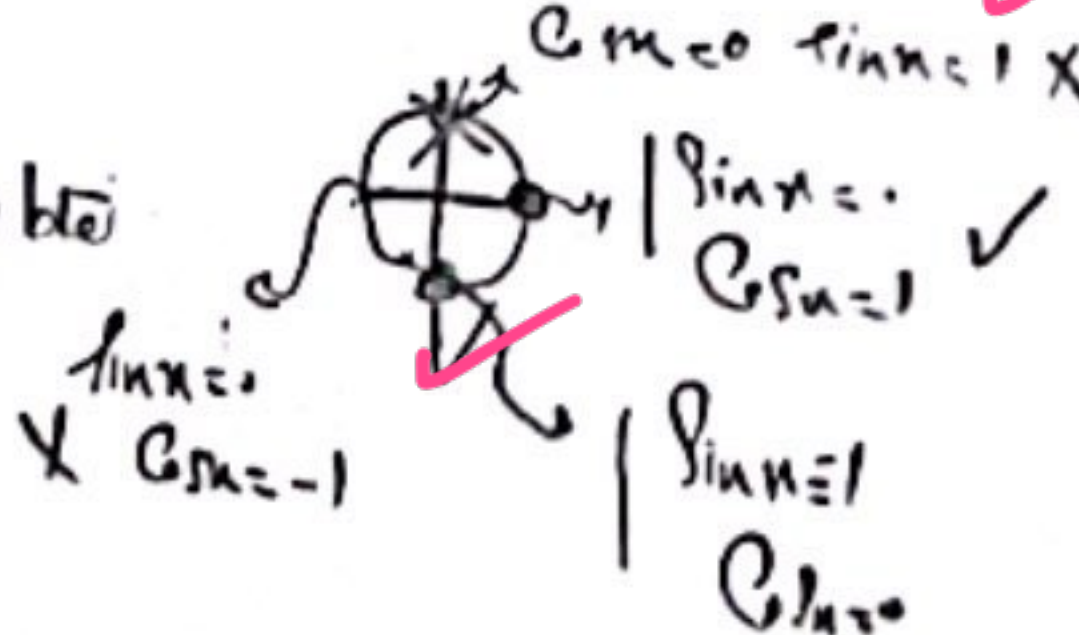
$$1 - y \cos^y x = 1$$

$$\cos x = 0$$



$$x = k\pi + \frac{\pi}{y}$$

$$b) \sin^y x - \cos^y x = -1 \rightarrow \sin^y x = \cos^y x - 1$$



$$x = 2k\pi, 2k\pi - \frac{\pi}{y}$$

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سوال ۴ قسمت الف)

$$C.s(-n) = C.s n$$

$$C.s\left(\frac{\pi}{2} + n\right) C.s\left(n - \frac{\pi}{2}\right) = \frac{1}{2} = C.s\left(\frac{\pi}{2} + n\right) C.s\left(\frac{\pi}{2} - n\right) = \frac{1}{2}$$

$$\text{if } \alpha + \beta = \frac{\pi}{2} \rightarrow C.s \alpha = \sin \beta \rightarrow C.s\left(\frac{\pi}{2} + n\right) \sin\left(\frac{\pi}{2} + n\right) = \frac{1}{2}$$

$$\frac{1}{2} \sin\left(\frac{\pi}{2} + 2n\right) = \frac{1}{2} \rightarrow C.s 2n = \frac{1}{2} \rightarrow 2n = 2k\pi \pm \frac{\pi}{2}$$

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

$$C.s\left(2n - \frac{\pi}{4}\right) = -\sin 2n$$

سوال ۴ قسمت ب)

$$C.s\left(2n - \frac{\pi}{4}\right) = C.s\left(\frac{\pi}{2} + 2n\right)$$

$$2n - \frac{\pi}{4} = 2k\pi \pm \left(\frac{\pi}{2} + 2n\right) \quad \text{حالت ۱} \rightarrow 2k\pi + \frac{\pi}{4} + \frac{\pi}{2} = 0 \quad \times$$

$$\text{حالت ۲} \rightarrow 2n - \frac{\pi}{4} = 2k\pi - \frac{\pi}{2} - 2n$$

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

$$\sqrt{1 + \sin 2n} = \sqrt{2} C.s n \xrightarrow{\text{توان ۲}} 1 + \sin 2n = 2 C.s^2 n$$

سوال ۹

$$1 + \sin 2n = 2 - 2 \sin^2 n \rightarrow 2 \sin^2 n + \sin 2n - 1 = 0 \rightarrow \sin 2n = -1$$

$$\sin 2n = -1 \rightarrow 2n = 2k\pi - \frac{\pi}{2} \xrightarrow{\substack{0 \leq n \leq \pi \\ k \in \mathbb{Z}}} n = \frac{k\pi}{2}$$

$$\sin 2n = \frac{1}{2} \rightarrow 2n = 2k\pi + \frac{\pi}{6} \text{ یا } 2k\pi + \frac{5\pi}{6} \xrightarrow{\substack{0 \leq n \leq \pi \\ k \in \mathbb{Z}}} n = \frac{\pi}{12} \text{ یا } \frac{5\pi}{12}$$

چون عبارت به توان ۲ رسیده است جواب زائد تولید می‌کنند
به ازای $n = \frac{5\pi}{12}$ $C.s n$ منفرجه پس چون جواب را می‌بایست محدود داشت

$$C \cdot S^n - \sin^n C \cdot S^n = 1 \xrightarrow{C \cdot S^n = 1 - \sin^n}$$

$$1 - \sin^n - \sin^n C \cdot S^n = 1 \rightarrow \sin^n (1 + C \cdot S^n) = 0 \rightarrow \sin n = 0$$

$$\sin n = 0 \rightarrow n = k\pi \rightarrow n = 0, \pi, 2\pi \rightarrow C \cdot S^n = 1$$

$$C \cdot S^n = -1 \rightarrow n = 2k\pi + \pi \rightarrow n = \frac{2k\pi + \pi}{2} \rightarrow n = \frac{\pi}{2}, \frac{3\pi}{2}, \frac{5\pi}{2}, \dots$$

مسئله ۵ جواب دارد

$$\frac{\sin \frac{n}{2}}{1 + C \cdot S \frac{n}{2}} = \tan \frac{n}{2}$$

$$\frac{1}{\sin \frac{n}{2}} + \cot \frac{n}{2} = \frac{1 + C \cdot S \frac{n}{2}}{\sin \frac{n}{2}} = \frac{1}{\tan \frac{n}{2}} = \cot \frac{n}{2}$$

$$\tan \frac{n}{2} = \cot \frac{n}{2} \rightarrow \tan \frac{n}{2} = \tan \left(\frac{\pi}{2} - \frac{n}{2} \right)$$

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

$$\rightarrow k=0 \rightarrow n=\pi$$

$$\rightarrow k=-1 \rightarrow n=-\pi \rightarrow \text{افتتاح} = |\pi - (-\pi)| = 2\pi$$