

$$\textcircled{1} \quad \frac{\cos 2n}{1 - \cos n} = \frac{\cos n - 1}{\cos n + 1} \Rightarrow 0 = \cos n + \cos n - 1$$

$$\frac{(\cos n + 1)(\cos n - 1)}{\cos n + 1} = 0 \Rightarrow \cos n = -1$$

$$\text{ا) } n = 2K\pi + \frac{\pi}{4} \quad / \quad n = 2K\pi + \frac{3\pi}{4} \quad \leftarrow \text{جواب}$$

$$\text{ب) } \cos 2n + \cos n - 2 = 0 \Rightarrow \cos 2n - 1 + \cos n - 1 = 0$$

$$\cos 2n + \cos n - 2 = 0 \Rightarrow (\cos n + 1)(\cos n - 1) = 0$$

$$\cos n = 1 \Rightarrow n = 2K\pi \quad \leftarrow \text{جواب}$$

$$\textcircled{2} \quad \text{ا) } \sin n - \cos n = \sin n \cos n$$

$$-\cos n = \sin n \cos n$$

$$\sin n = -\frac{1}{\cos n} \Rightarrow \begin{cases} n = 2K\pi + \frac{3\pi}{4} \Rightarrow n = K\pi + \frac{3\pi}{4} \\ n = 2K\pi + \frac{5\pi}{4} \Rightarrow n = K\pi + \frac{5\pi}{4} \end{cases} \quad \leftarrow \text{جواب}$$

$$\text{ب) } 1 + \cos n + \sin n = 0$$

$$\cos n + \sin n = -1 \Rightarrow \sqrt{2} \sin(n + \frac{\pi}{4}) = 0$$

$$\Rightarrow \begin{cases} n + \frac{\pi}{4} = 2K\pi \Rightarrow n = 2K\pi - \frac{\pi}{4} \\ n + \frac{\pi}{4} = 2K\pi + \pi \Rightarrow n = 2K\pi + \frac{3\pi}{4} \end{cases} \quad \leftarrow \text{جواب}$$

$$\textcircled{3} \quad \cot n (\cos n + 1) = \frac{1}{\sin n} \xrightarrow{\sin n \neq 0} \cos n (\cos n + 1) = 1$$

$$\Rightarrow \cos^2 n + \cos n - 1 = 0 \Rightarrow (\cos n + 2)(\cos n - 1) = 0$$

$$\cos n = -1 \Rightarrow \sin n = 0 \quad \text{G.G.} \quad \leftarrow \text{جواب}$$

$$n = 2K\pi + \frac{\pi}{2} \quad \leftarrow \text{جواب}$$

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

$$\Rightarrow \cancel{\sin \frac{\pi}{x}} = \cancel{\cos \frac{\pi}{x}} \Rightarrow \sin \frac{\pi}{x} = \pm \cos \frac{\pi}{x}$$

$$\hookrightarrow \tan \frac{\pi}{x} = \pm 1 \rightarrow \frac{\pi}{x} = K\pi \pm \frac{\pi}{2} \Rightarrow \boxed{x = (K\pi \pm \pi)}$$

$$-\pi, \pi \rightarrow |\pi - (-\pi)| = 2\pi \quad \text{جواب}$$

$$(5) \cos^2 u - \sin^2 u \cos^2 u = 1 \div \sin^2 u \rightarrow \cot^2 u - \cos^2 u = 1 \div \sin^2 u$$

$$\rightarrow \cot^2 u - \cos^2 u = 1 + \cot^2 u$$

$$\cos^2 u = -1 \rightarrow K\pi = 2K\pi \pm \pi \Rightarrow \boxed{u = \frac{2K\pi \pm \pi}{2}}$$

K	0	1	2	3
u	$\frac{\pi}{2}$	π	$\frac{3\pi}{2}$	2π

$$\sin^2 u = 0 \rightarrow 0, \pi, 2\pi \rightarrow K\pi = 0$$

$$(6) \frac{1 - \tan u}{1 + \tan u} = \tan \pi u$$

$$\hookrightarrow \tan(A-B) = \frac{\tan A - \tan B}{1 + \tan A \tan B} \Rightarrow \tan\left(\frac{\pi}{x} - u\right) = \tan \pi u$$

$$\hookrightarrow \pi u = K\pi + \frac{\pi}{x} - u \Rightarrow \boxed{u = \frac{K\pi}{x} + \frac{\pi}{14}}$$

$$(7) \sin u + \cos u = \sqrt{2} \cos \pi u \rightarrow \sin\left(u + \frac{\pi}{4}\right) = \sin\left(\frac{\pi}{4} - \pi u\right)$$

$$\Rightarrow u + \frac{\pi}{4} = 2K\pi + \frac{\pi}{4} - \pi u \quad \text{or} \quad u + \frac{\pi}{4} = 2K\pi + \frac{\pi}{4} + \pi u$$

$$\hookrightarrow \pi u = 2K\pi + \frac{\pi}{4} - \frac{\pi}{4}$$

$$\hookrightarrow \boxed{u = \frac{2K\pi}{1} + \frac{\pi}{14}}$$

$$\hookrightarrow -u = 2K\pi + \frac{\pi}{4} - \frac{\pi}{4}$$

$$\hookrightarrow \boxed{u = -2K\pi - \frac{\pi}{14}}$$

K	0	1
u	$\frac{\pi}{14}$	$\frac{2\pi}{14}$

Scanned with

$$(K) \rightarrow \frac{\sin^r x + \cos^r x}{1} + \sin^r x - \sin x \cos x = r$$

$$\Rightarrow \frac{\sin^r x - \sin x \cos x}{\sin^r x} = \frac{1}{\sin^r x} \Rightarrow 1 - \cot x = 1 + \cot^r x$$

$$\Rightarrow \cot x = 0 \Rightarrow \left\{ \begin{array}{l} x = K\pi + \frac{\pi}{2} \\ x = K\pi + \frac{3\pi}{2} \end{array} \right\}$$

$$(F) \cos\left(\frac{\pi}{x} + x\right) \cos\left(x - \frac{\pi}{x}\right) = \frac{1}{x}$$

$$\sin\left(\frac{\pi}{x} - \left(\frac{\pi}{x} + x\right)\right)$$

$$\sin\left(\frac{\pi}{x} - x\right) = -\sin\left(x - \frac{\pi}{x}\right) \cdot \cos\left(x - \frac{\pi}{x}\right) = \frac{1}{x}$$

$$\Rightarrow -\frac{1}{x} \sin\left(x - \frac{\pi}{x}\right) = \frac{1}{x} \rightarrow \cos^r x = \frac{1}{x}$$

$$\left\{ x = K\pi \pm \frac{\pi}{4} \right\}$$

$$\rightarrow \cos\left(x - \frac{\pi}{x}\right) = -\cos\left(\frac{\pi}{x} - x\right) = \cos\left(x + \frac{\pi}{x}\right)$$

$$\Rightarrow x + \frac{\pi}{x} = K\pi \pm \left(\frac{\pi}{x} - x\right)$$

$$\Rightarrow x = K\pi + \frac{\pi}{x} - x - \frac{\pi}{x} \Rightarrow x = K\pi - \frac{\pi}{x}$$

$$\left\{ x = \frac{K\pi}{2} - \frac{\pi}{2x} \right\}$$

$$(G) \frac{\sin^r x \cos^r x + \sin^r x}{\sin^r x} - \sin^r x = \cos^r x$$

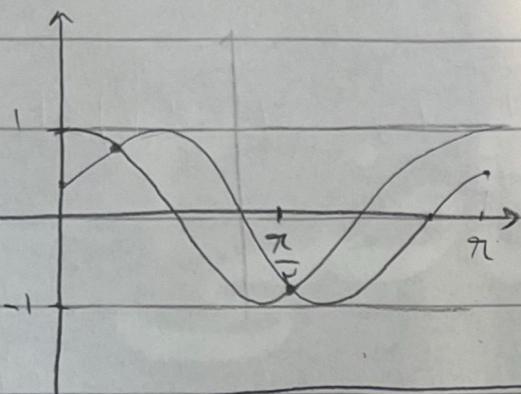
$$\Rightarrow x \cos^r x + 1 = 1 \rightarrow \cos^r x = 0 \Rightarrow x = K\pi / x = K\pi + \frac{\pi}{x}$$

$$\Rightarrow x = K\pi \left\{ x = K\pi \pm \frac{\pi}{x} \right\}$$

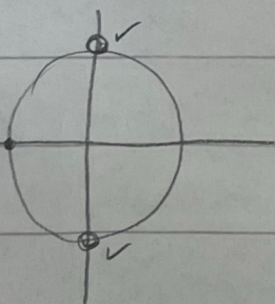
$$\sin \theta + \frac{\pi}{2} = \cos \theta$$

ادامہ سوال ۹

جواب ۲

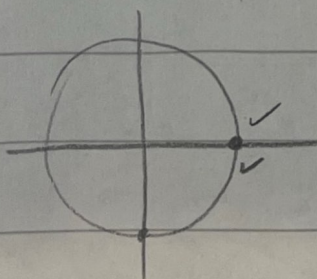


10) الف) $\sin^2 \theta - \cos^2 \theta = 1 \Rightarrow \cos^2 \theta = -1$



$$\theta = \frac{\pi}{2}, \frac{3\pi}{2}$$

ب) $\sin^2 \theta - \cos^2 \theta = -1$



$$\theta = 0, \pi, \frac{3\pi}{2}$$