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$$\text{الف) } \cos^2 x = 3 \sin x - 1 \rightarrow 1 - 2 \sin^2 x = 3 \sin x - 1 \rightarrow 2 \sin^2 x + 3 \sin x - 2 = 0$$

$$\xrightarrow{\text{دعوی}} \sin^2 x + 3 \sin x - 2 = 0 \rightarrow (\sin x + 4)(\sin x - 1) = 0 \rightarrow \sin x = \frac{-1}{2} = -\frac{1}{2} \text{ غلط}$$

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

$$\rightarrow x = 2k\pi + \frac{\pi}{6}, x = 2k\pi + \pi - \frac{\pi}{6}$$

$$\text{ب) } \cos^2 x + \cos x - 2 = 0 \rightarrow 2 \cos^2 x + \cos x - 3 = 0 \xrightarrow{\text{دعوی}} (\cos x + 3)(\cos x - 2) = 0$$

$$\rightarrow \cos x = \frac{-1}{2} = \text{غلط}$$

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

$$\text{الف) } \sin^2 x - \cos^2 x = \sin x \rightarrow (\sin^2 x - \cos^2 x)(\sin^2 x + \cos^2 x) = \sin x$$

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

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

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

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

$$\text{ب) } 2 \cos^2 x + 2 \sin x \cdot \cos x = 1 \rightarrow -2 \sin x \cdot \cos x = 2 \cos^2 x - 1$$

$$\rightarrow -\sin 2x = \cos^2 x \rightarrow \sin 2x = \sin\left(\frac{\pi}{2} + x\right) \rightarrow x = 2k\pi + \frac{\pi}{2} + x \quad \emptyset$$

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

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

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

$$\text{الف) } \cot n (r \cos n + 1) = \frac{1}{\sin n} \rightarrow \frac{\cos n}{\sin n} (r \cos n + 1) = \frac{1}{\sin n} \xrightarrow{\sin n \neq 0} \text{①}$$

$$r \cos^2 n + \cos n - 1 = 0 \rightarrow \cos n = -1 \rightarrow \emptyset \quad \begin{matrix} \text{حذف} \\ \sin n = 0 \end{matrix} \text{ ①}$$

$$\rightarrow \cos n = \frac{1}{r} \rightarrow n = 2k\pi \pm \frac{\pi}{r}$$

$$\text{ب) } r \sin^2 n - \sin n \cdot \cos n + \cos^2 n = r \rightarrow \sin^2 n + 1 - \sin n - \cos n = r$$

$$\rightarrow \sin^2 n - \sin n \cdot \cos n = 1 \xrightarrow{+ \cos^2 n} \tan^2 n - \tan n = 1 + \tan n \rightarrow \tan n = -1 \rightarrow n = k\pi + \frac{3\pi}{4}$$

$$\text{الف) } \cos\left(\frac{\pi}{r} + n\right) \cos\left(n - \frac{\pi}{r}\right) = \frac{1}{r} \rightarrow \left(\frac{\sqrt{r}}{r} \cos n - \frac{\sqrt{r}}{r} \sin n\right) \left(\frac{\sqrt{r}}{r} \cos n + \frac{\sqrt{r}}{r} \sin n\right) = \frac{1}{r} \quad -\text{ف}$$

$$\rightarrow \frac{1}{r} \cos^2 n - \frac{1}{r} \sin^2 n = \frac{1}{r} \rightarrow \cos^2 n = \frac{1}{r} \rightarrow -r n = 2k\pi \pm \frac{\pi}{r} \rightarrow n = k\pi \pm \frac{\pi}{r}$$

$$\text{ب) } \cos\left(rn - \frac{\pi}{r}\right) = -\sin rn \rightarrow \cos\left(rn - \frac{\pi}{r}\right) = \cos\left(\frac{\pi}{r} + rn\right)$$

$$\rightarrow rn - \frac{\pi}{r} = 2k\pi \pm \left(rn + \frac{\pi}{r}\right) \rightarrow rn = 2k\pi - rn - \frac{\pi}{r} \rightarrow n = \frac{k\pi}{r} - \frac{\pi}{r}$$

$$\frac{\sin rn + \sin rn}{\sin rn} - \sin rn = \cos^2 n \rightarrow \sin rn + \sin rn = \sin rn \rightarrow \sin rn = 0 \rightarrow$$

$$n = 2k\pi, 2k\pi + \pi \xrightarrow{\text{حذف}} n = \emptyset$$

مخرج صفري شود

$$\frac{\sin \frac{n}{r}}{1 + \cos \frac{n}{r}} = \frac{1}{\sin \frac{n}{r}} + \frac{\cos \frac{n}{r}}{\sin \frac{n}{r}} \rightarrow \sin^2 \frac{n}{r} = (1 + \cos \frac{n}{r})^r \rightarrow \sin^2 \frac{n}{r} = 1 + \cos^2 \frac{n}{r} + r \cos \frac{n}{r}$$

$$\rightarrow 1 - \cos^2 \frac{n}{r} = 1 + \cos^2 \frac{n}{r} + r \cos \frac{n}{r} \rightarrow r \cos^2 \frac{n}{r} + r \cos \frac{n}{r} = 0 \rightarrow \cos \frac{n}{r} (\cos \frac{n}{r} + 1) = 0$$

$$\cos \frac{n}{r} = 0 \rightarrow \frac{n}{r} = k\pi + \frac{\pi}{2} \rightarrow n = 2k\pi + \pi$$

$$\xrightarrow{k \dots} -n = k, n = -n \rightarrow |n - (k)| = r n$$

$$\cos^2 n - \sin^2 n \cos^2 n = 1 \rightarrow -\sin^2 n \cdot \cos^2 n = \frac{1 - \cos^2 n}{\sin^2 n} \xrightarrow{\sin n \neq 0} \cos^2 n = 0 \quad -V$$

$$\rightarrow \cos n = 0 \quad \bigoplus \rightarrow n = \frac{kn}{f} \rightarrow \boxed{\text{جواب} = \emptyset}$$

$$\frac{1 - \tan n}{1 + \tan n} = \tan^2 n \rightarrow \tan\left(\frac{n}{f} - n\right) = \tan^2 n \rightarrow \gamma n = kn + \frac{k}{f} - n \quad -A$$

$$\rightarrow fn = kn + \frac{k}{f} \rightarrow n = \frac{kn}{f} + \frac{k}{f}$$

$$\sqrt{1 + \sin^2 n} = \sqrt{\gamma} \cos^2 n \xrightarrow{(\cdot)^2} 1 + \sin^2 n = \gamma \cos^2 n \rightarrow \sin^2 n = \gamma \cos^2 n - 1 \quad -9$$

$$\rightarrow \sin^2 n = \cos^2 n \rightarrow \sin^2 n = \sin^2\left(\frac{k}{f} + fn\right) \rightarrow \gamma n = \gamma kn + \frac{k}{f} + fn$$

$$\rightarrow \gamma n = \gamma kn + n - \frac{k}{f} - fn$$

$$\rightarrow n = -kn - \frac{k}{f} \rightarrow \frac{k}{1f}, \frac{8k}{1f}, \frac{9k}{1f} \Rightarrow \text{جواب} \quad (0, n)$$

$$\rightarrow n = \frac{kn}{f} + \frac{k}{f}$$

$$\text{الف) } \sin^2 n - \cos^2 n = 1 \rightarrow (\sin^2 n + \cos^2 n)(\sin^2 n - \cos^2 n) = 1 \rightarrow \cos^2 n = -1 \quad -6$$

$$\gamma n = \gamma kn + k \rightarrow n = kn + \frac{k}{f} \rightarrow \left\{\frac{k}{f}, \frac{\gamma k}{f}\right\}$$

$$\text{ب) } \sin^2 n - \cos^2 n = -1 \rightarrow \sin^2 n - \cos^2 n + \sin^2 n + \cos^2 n = 0 \rightarrow$$

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

$$\rightarrow \frac{\sin^2 n}{\cos^2 n} = \frac{\cos^2 n - 1}{\sin^2 n + 1} \rightarrow \frac{\overbrace{\sin^2 n}^{\text{موجب}}}{\underbrace{\cos^2 n}_{\text{موجب}}} = \frac{-\gamma \sin^2 \frac{n}{f}}{\underbrace{(\sin^2 \frac{n}{f} + \cos^2 \frac{n}{f})}_{\text{موجب}}} \gamma \rightarrow \frac{-\gamma \sin^2 \frac{n}{f}}{\gamma}$$

$$\rightarrow \underbrace{-\gamma \sin^2 \frac{n}{f}}_{\text{موجب}} > 0 \rightarrow \text{غير ممكن} \rightarrow \boxed{n = \emptyset}$$