

الف) $\cos 2\alpha + \sin \alpha - 1 \rightarrow \cos^2 \alpha - \sin^2 \alpha + \sin \alpha - 1 \rightarrow 1 - \sin^2 \alpha - \sin^2 \alpha + \sin \alpha - 1$
 $\rightarrow \sin^2 \alpha + \sin \alpha - 1 = 0$
 $\sin \alpha = -1 \rightarrow$ غلط
 $\sin \alpha = \frac{1}{2} \rightarrow$ $2k\pi + \frac{\pi}{6}, 2k\pi + \frac{5\pi}{6}$

ب) $\cos 2\alpha + \cos \alpha = 1 \rightarrow \cos^2 \alpha - \sin^2 \alpha + \cos \alpha - 1 = 0 \rightarrow \cos^2 \alpha + \cos \alpha - 1 + \cos \alpha - 1 = 0$
 $\cos \alpha = 1 \rightarrow$ $2k\pi$
 $\cos \alpha = -\frac{1}{2} \rightarrow$ غلط

الف) $\sin^2 \alpha - \cos^2 \alpha = \sin \alpha \rightarrow -\cos 2\alpha = \sin \alpha \rightarrow -1 - \sin 2\alpha = \sin \alpha \rightarrow \sin \alpha = -\frac{1}{2}$
 $\alpha = 2k\pi + (-\frac{\pi}{6}) \rightarrow$ $\alpha = k\pi - \frac{\pi}{12}$
 $\alpha = 2k\pi + \pi - (-\frac{\pi}{6}) \rightarrow \alpha = 2k\pi + \frac{7\pi}{6} \rightarrow$ $\alpha = k\pi + \frac{7\pi}{12}$

ب) $\cos^2 \alpha + \sin \alpha \cos \alpha = 1 \rightarrow \sin^2 \alpha \cos \alpha = 1 - \cos^2 \alpha \rightarrow \sin^2 \alpha = -\cos 2\alpha$
 $\alpha = \frac{\pi}{2} \rightarrow \tan \alpha = -1 \rightarrow \alpha = k\pi - \frac{\pi}{4} \rightarrow$ $\alpha = \frac{k\pi}{2} - \frac{\pi}{4}$

الف) $\cot \alpha (\cos \alpha + 1) = \frac{1}{\sin \alpha} \rightarrow \frac{\cos \alpha (\cos \alpha + 1)}{\sin \alpha} = \frac{1}{\sin \alpha} \rightarrow \cos^2 \alpha + \cos \alpha - 1 = 0$
 $\cos \alpha = \frac{1}{2} \rightarrow$ $2k\pi \pm \frac{\pi}{3}$
 $\cos \alpha = -1 \rightarrow$ $2k\pi + \pi$

ب) $\sin^2 \alpha - \sin \alpha \cos \alpha + \cos^2 \alpha = 1 \rightarrow \sin^2 \alpha - \sin \alpha \cos \alpha = 1 \rightarrow \frac{1 - \cos 2\alpha}{2} - \frac{\sin 2\alpha}{2} = 1$
 $1 - \cos 2\alpha - \sin 2\alpha = 2 \rightarrow \sin 2\alpha + \cos 2\alpha = -1 \rightarrow \sqrt{2} \sin(2\alpha + \frac{\pi}{4}) = -1$
 $\alpha + \frac{\pi}{4} = 2k\pi - \frac{\pi}{4} \rightarrow \alpha = 2k\pi - \frac{\pi}{2} \rightarrow$ $\alpha = k\pi - \frac{\pi}{2}$
 $\alpha + \frac{\pi}{4} = 2k\pi + \frac{3\pi}{4} \rightarrow \alpha = 2k\pi + \frac{\pi}{2} \rightarrow$ $\alpha = k\pi + \frac{\pi}{2}$

الف) $\cos(\frac{\pi}{4} + \alpha) \cos(\pi - \frac{\pi}{4}) = \frac{1}{2} \rightarrow \frac{\sqrt{2}}{2} (\cos \alpha - \sin \alpha) \times \frac{\sqrt{2}}{2} (\cos \alpha + \sin \alpha) = \cos^2 \alpha - \sin^2 \alpha = \frac{1}{2}$
 $\cos 2\alpha = \frac{1}{2} \rightarrow 2\alpha = 2k\pi \pm \frac{\pi}{3} \rightarrow$ $\alpha = k\pi \pm \frac{\pi}{6}$

ب) $\cos(\pi - \frac{\pi}{4}) = -\sin(\frac{\pi}{4}) \rightarrow \cos(\pi - \frac{\pi}{4}) = \sin(-\frac{\pi}{4}) \rightarrow \cos(\pi - \frac{\pi}{4}) = \cos(\frac{\pi}{4} + \pi)$
 $\pi - \frac{\pi}{4} = k\pi + (\frac{\pi}{4} + \pi) \rightarrow \pi - \frac{\pi}{4} = k\pi + \frac{5\pi}{4} \rightarrow \pi - \frac{\pi}{4} - \frac{5\pi}{4} = k\pi \rightarrow \pi - \frac{6\pi}{4} = k\pi \rightarrow \pi - \frac{3\pi}{2} = k\pi$

$n = \frac{k\pi}{2} - \frac{3\pi}{2}$
 $\frac{\sin 2n + \sin n}{\sin n} = \sin^2 n + \cos^2 n \rightarrow \frac{\sin 2n (\cos n + 1)}{\sin n} = \sin^2 n + \cos^2 n \rightarrow \cos n + 1 = 1 \rightarrow \cos n = 0$
 $\cos n = 0 \rightarrow$ $n = k\pi + \frac{\pi}{2}$

$$\frac{\pi}{r} \cdot x \rightarrow \frac{\sin x}{1 + \cos x} = \frac{1 + \cos x}{\sin x} \rightarrow \frac{\sin x}{1 + \cos x} = 1 + \cos x$$

$$\rightarrow r \cos^2 x + r \cos x = 0 \rightarrow r \cos x (\cos x + 1) = 0 \rightarrow \begin{cases} \cos x = 0 \\ \cos x = -1 \end{cases}$$

$$\rightarrow \cos \frac{\pi}{r} = 0 \rightarrow \frac{\pi}{r} = k\pi + \frac{\pi}{2} \rightarrow x = rk\pi + \frac{\pi}{2} \rightarrow \begin{matrix} k=1 \rightarrow \frac{\pi}{2} \\ k=2 \rightarrow \frac{3\pi}{2} \end{matrix}$$

$$\cos \frac{\pi}{r} = -1 \rightarrow \frac{\pi}{r} = rk\pi + \pi \rightarrow x = rk\pi + \pi \rightarrow \begin{matrix} x = \pi \\ (-\pi, \frac{\pi}{r}) \end{matrix} \rightarrow \text{...}$$

$$x = \pi, x = -\pi \rightarrow |\pi - (-\pi)| = 2\pi$$

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

$$\cos 2x = -1 \rightarrow rx = rk\pi + \pi \rightarrow x = \frac{rk\pi}{r} = \frac{\pi}{r} \rightarrow \text{...}$$

$$\frac{1 - \tan x}{1 + \tan x} = \tan \theta x \rightarrow$$

$$\frac{\cos x - \sin x}{\cos x + \sin x} = \frac{\cos x - \sin x}{\cos x + \sin x} = \frac{\sin x}{\cos x}$$

$$\cos x \cos x - \cos x \sin x = \sin x \cos x + \sin x \sin x \rightarrow \cos x \cos x - \sin x \sin x = \sin x (\cos x + \sin x)$$

$$\cos(x), \sin(x) \xrightarrow{-\cos(x)} 1 = \tan \theta x \rightarrow \theta x = k\pi + \frac{\pi}{4} \rightarrow \boxed{x = \frac{k\pi}{4} + \frac{\pi}{4}}$$

$$\sqrt{1 + \sin^2 x} = \sqrt{r} \cos^2 x \rightarrow 1 + \sin^2 x = r \cos^2 x$$

$$\rightarrow \sin^2 x = r \cos^2 x - 1 \rightarrow \sin^2 x = \cos^2 x - \sin^2 x \rightarrow$$

$$\sin^2 x = \cos^2 x$$

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

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

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

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

$$rx = k\pi + \pi \rightarrow \boxed{x = k\pi + \frac{\pi}{r}}$$

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

$$\sin^2 x = 1 \rightarrow \cos^2 x = 0 \rightarrow \text{X}$$

$$\sin^2 x = 0 \rightarrow \cos^2 x = 1 \rightarrow \checkmark$$

$$\sin^2 x = 1 \rightarrow \cos^2 x = 0 \rightarrow \checkmark$$

$$\sin^2 x = 0 \rightarrow \cos^2 x = 1 \rightarrow \text{X}$$



$$\boxed{k\pi, k\pi + \frac{\pi}{r}}$$