

سوال ۱

$$\cos y \alpha = y \sin \alpha - 1 \rightarrow 1 - y \sin \alpha = y \sin \alpha - 1 \rightarrow y \sin \alpha + y \sin \alpha - y = 0$$

$$\rightarrow \sin \alpha = \frac{-y \pm \sqrt{1 - (y)(y)(-1)}}{y} \begin{cases} \frac{-y + 1}{y} = \frac{1-y}{y} \\ \frac{-y - 1}{y} = -\frac{y+1}{y} \end{cases} \rightarrow \sin \alpha = \frac{1}{y} \rightarrow \alpha = yk\pi + \frac{\pi}{4}, yk\pi + \frac{5\pi}{4}$$

$$\text{ب) } \cos y \alpha + \cos \alpha - y = 0 \rightarrow y \cos \alpha - 1 + \cos \alpha - y = 0 \rightarrow y \cos \alpha + \cos \alpha - y = 0$$

$$\rightarrow \cos \alpha = \frac{-1 \pm \sqrt{1 - (y)(y)(-1)}}{y} = \begin{cases} \frac{-1 + 1}{y} = \frac{0}{y} = 0 \\ \frac{-1 - 1}{y} = \frac{-2}{y} = -\frac{2}{y} \end{cases} \rightarrow \cos \alpha = 1 \rightarrow \alpha = yk\pi$$

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

سوال ۲

$$\rightarrow -\cos y x = y \sin x \cos x \rightarrow y \sin x \cos x + \cos y x = 0 \rightarrow \cos y x (y \sin x + 1) = 0$$

$$\rightarrow \cos y x = 0 \rightarrow y x = k\pi + \frac{\pi}{2} \rightarrow x = \frac{k\pi}{y} + \frac{\pi}{2} \quad \text{و} \quad \sin x = \frac{1}{y} \rightarrow x = yk\pi - \frac{\pi}{4} \quad \text{و} \quad yk\pi - \frac{5\pi}{4}$$

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

$$\rightarrow \cos y x = -\sin^2 x \xrightarrow{\div \cos x} \tan y x = -1 \rightarrow y x = k\pi - \frac{\pi}{4} \rightarrow x = \frac{k\pi}{y} - \frac{\pi}{4}$$

$$\text{الف) } \cot x (y \cos x + 1) = \frac{1}{\sin x} \rightarrow \frac{\cos x (y \cos x + 1)}{\sin x} = \frac{1}{\sin x}$$

سوال ۳

$$\rightarrow \frac{\cos x (y \cos x + 1) - 1}{\sin x} = 0 \rightarrow y \cos^2 x + \cos x - 1 = 0 \rightarrow y \cos^2 x + \cos x - 1 = 0$$

$$\rightarrow \cos x = \frac{-1 \pm \sqrt{1 - (y)(y)(-1)}}{y} = \frac{-1 \pm y}{y} \begin{cases} \cos x = \frac{-1 + y}{y} = \frac{y-1}{y} \rightarrow x = yk\pi + \frac{\pi}{2} \\ \cos x = \frac{-1 - y}{y} = -\frac{y+1}{y} \rightarrow x = yk\pi \pm \frac{\pi}{y} \end{cases}$$

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

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

$$\rightarrow \cos x = 0 \rightarrow x = yk\pi \pm \frac{\pi}{2}$$

$$\rightarrow \cos x + \sin x = 0 \rightarrow \cos x = -\sin x \xrightarrow{\div \cos x} \tan x = -1 \rightarrow x = k\pi - \frac{\pi}{4}$$

$$\text{الف) } \cos\left(\frac{\pi}{6} + x\right) \cos\left(x - \frac{\pi}{6}\right) = \frac{1}{4}$$

(ف) السؤال

$$\rightarrow \cos\left(\frac{\pi}{6} + x\right) \cos\left(x - \frac{\pi}{6}\right) = \frac{1}{4} \left[\overset{\cos yx}{\cos\left(-\frac{\pi}{6} + x + x - \frac{\pi}{6}\right)} + \cos\left(\frac{\pi}{6} + x - x + \frac{\pi}{6}\right) \right] = \frac{1}{4}$$

$$\rightarrow \cos yx = \frac{1}{4} \rightarrow yx = yK\pi \pm \frac{\pi}{4} \rightarrow \boxed{x = K\pi \pm \frac{\pi}{4}}$$

$$\text{ب) } \cos\left(x - \frac{\pi}{4}\right) = \cos yx \cos \frac{\pi}{4} + \sin yx \sin \frac{\pi}{4} = -\sin yx \rightarrow \cos yx \cos \frac{\pi}{4} = -\sin yx - \sin yx \sin \frac{\pi}{4}$$

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

$$\rightarrow \frac{\sin \frac{\pi}{4} - 1}{\cos \frac{\pi}{4}} = \tan yx \rightarrow \tan \frac{\pi}{4} = \tan yx \rightarrow yx = K\pi \pm \frac{\pi}{4} \rightarrow \boxed{x = \frac{K\pi \pm \pi}{4}}$$

$$\frac{\sin fx + \sin yx}{\sin yx} - \sin yx = \cos^2 x \rightarrow \frac{\sin fx + \sin yx}{\sin yx} = 1 \rightarrow \sin fx + \sin yx = \sin yx$$

سؤال 6

$$\rightarrow \sin fx = 0 \rightarrow fx = K\pi \rightarrow \boxed{x = \frac{K\pi}{5}}$$