(۱) الف)

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

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

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

$$\Rightarrow \sin x = \begin{cases} \frac{1}{2} \\ -\frac{3}{2} \times \end{cases}$$

$$x = \begin{cases} 2k\pi + \frac{\pi}{6} \\ 2k\pi + \frac{5\pi}{6} \end{cases}$$

ب)

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

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

$$\Rightarrow \cos x = \begin{cases} 1 \\ -\frac{1}{2} \times \end{cases}$$

$$x = 2k\pi$$

(۲) الف)

$$-\cos 2x = \sin 4x$$

$$\cos(\pi - 2x) = \cos\left(\frac{\pi}{2} - 4x\right)$$

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

$$\Rightarrow x = k\pi - \frac{\pi}{4}$$

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

$$\Rightarrow x = \frac{k\pi}{3} + \frac{\pi}{4}$$

ب)

$$\div \cos^2 x \longrightarrow 2 + 2\tan x = \frac{1}{\cos^2 x}$$

$$\frac{1}{\cos^2 x} \rightarrow 1 + \tan^2 x$$

$$\Rightarrow \tan^2 x - 2\tan x - 1 = 0$$

$$\sin x \neq 0$$

(۳) الف)

$$\times \sin x \longrightarrow 2\cos^2 x + \cos x - 1 = 0$$

$$\Rightarrow \cos x = \begin{cases} -1 \\ \frac{1}{2} \end{cases} \quad \sin x = 0 \times$$

$$\Rightarrow x = 2k\pi \pm \frac{\pi}{3}$$

ب)

$$\div \sin^2 x \longrightarrow 2 - \cot x + \cot^2 x = \frac{2}{\sin^2 x}$$

$$2 + 2\cot^2 x$$

$$\Rightarrow \cot^2 x + \cot x = 0$$

$$\Rightarrow \cot x = \begin{cases} 0 \\ -1 \end{cases} \quad \Rightarrow x = k\pi + \frac{\pi}{2}$$

$$\Rightarrow x = k\pi - \frac{\pi}{4}$$

(۴) الف)

$$-\sin\left(x - \frac{\pi}{4}\right)$$

$$\cos\left(x - \frac{\pi}{4}\right)\cos\left(\frac{\pi}{2} + x - \frac{\pi}{4}\right) = \frac{1}{4} \longrightarrow \times -2$$

$$\sin\left(2x - \frac{\pi}{2}\right) = -\frac{1}{2}$$

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

$$2x - \frac{\pi}{2} = 2k\pi + \frac{7\pi}{6} \Rightarrow x = k\pi + \frac{5\pi}{6}$$

ب)

$$\cos\left(2\pi - \frac{\pi}{9}\right) = \cos\left(\frac{\pi}{2} + 2x\right)$$

$$2\pi - \frac{\pi}{9} = 2k\pi + \frac{\pi}{2} + 2x \Rightarrow x = k\pi + \frac{25\pi}{36}$$

$$2\pi - \frac{\pi}{9} = 2k\pi - \frac{\pi}{2} - 2x \Rightarrow x = k\pi - \frac{43\pi}{36}$$

(۵)

$$\frac{\sin 2x\,(2\cos 2x + 1)}{\sin 2x} = 4\cos^2 x - 1$$

$$4\cos^2 x + \cos 2x - 2 = 4\cos^2 x - 1$$

$$\Rightarrow \cos 2x = \frac{1}{2} \quad x = k\pi \pm \frac{\pi}{6}$$

(۷)

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

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

$$\Rightarrow \sin x = 0$$

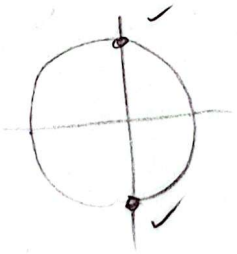
$$\Rightarrow \cos^2 x = -1$$

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

۱۵ نمره

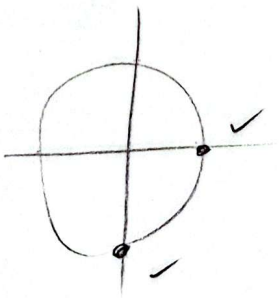
(۱۵)

الف)



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

ب)



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