

الف) $\cos 2x = 3 \sin x - 1$
 $\Rightarrow 1 + 3 \sin^2 x + 3 \sin x - 1 = 0 \Rightarrow \sin^2 x + \sin x = 0$
 $\Rightarrow \sin x = -\frac{1}{3} \times \quad \sin x = \frac{1}{3} \checkmark$
 $\Rightarrow x = 2k\pi + \frac{\pi}{3}$
 $x = 2k\pi + \pi - \frac{\pi}{3} = 2k\pi + \frac{2\pi}{3}$

$\cos 2x + \cos x - 1 = 0$
 $1 \cos 2x + \cos x - 1 = 0$
 $\Rightarrow \cos 2x + \cos x - 1 = 0 \Rightarrow \cos x = \frac{1}{2} \times$
 $\cos x = \frac{1}{2} = 1 \checkmark$
 $\Rightarrow x = 2k\pi$

الف) $\cos x - \sin x = -\sin x$
 $\Rightarrow \cos x = -\sin x \Rightarrow \cos x = -\sin x \cdot \cos x$
 $\Rightarrow \cos x = 0 \Rightarrow x = k\pi + \frac{\pi}{2} \Rightarrow x = \frac{k\pi}{2} + \frac{\pi}{2}$
 $\sin 2x = -\frac{1}{2} \Rightarrow x = k\pi - \frac{\pi}{6} \Rightarrow x = k\pi - \frac{\pi}{6}$
 $\Rightarrow x = 2k\pi + \frac{5\pi}{6} \Rightarrow x = k\pi + \frac{5\pi}{12}$

الف) $1 \cos^2 x + 1 \sin^2 x \cos x = 1$
 $\Rightarrow 1 \cos^2 x - 1 + 1 \sin^2 x \cos x = 0 \Rightarrow \cos^2 x + \sin^2 x = 0$
 $\Rightarrow \cos^2 x = -\sin^2 x$
 $\Rightarrow x = k\pi + \frac{\pi}{2} \Rightarrow x = \frac{k\pi}{2} + \frac{\pi}{2}$

الف) $\cos x (1 \cos x + 1) = \frac{1}{\sin x}$
 $\Rightarrow \frac{\cos x}{\sin x} (1 \cos x + 1) = \frac{1}{\sin x}$
 $\Rightarrow 1 \cos^2 x + \cos x - 1 = 0$
 $\begin{cases} \cos x = -1 \Rightarrow x = 2k\pi + \pi \\ \cos x = \frac{1}{2} \Rightarrow x = 2k\pi + \frac{2\pi}{3} \end{cases}$

الف) $\cos(\frac{\pi}{2} + x) = \sin(\frac{\pi}{2} - x - \frac{\pi}{2})$
 $\Rightarrow -\sin(x - \frac{\pi}{2}) \cdot \cos(x - \frac{\pi}{2}) = \frac{1}{2}$
 $\Rightarrow -\frac{1}{2} \sin(x - \frac{\pi}{2}) = \frac{1}{2}$
 $\Rightarrow \sin(x - \frac{\pi}{2}) = -1 \Rightarrow x - \frac{\pi}{2} = 2k\pi - \frac{\pi}{2} \Rightarrow x = 2k\pi$
 $\Rightarrow x = k\pi + \frac{\pi}{2}$

$\cos(x - \frac{\pi}{2}) = \sin(\frac{\pi}{2} - x + \frac{\pi}{2})$
 $\Rightarrow \sin(-x + \frac{\pi}{2}) = \sin(-x)$
 $\Rightarrow -x + \frac{\pi}{2} = 2k\pi - x \Rightarrow x = 2k\pi$
 $\Rightarrow x = -\frac{k\pi}{2} + \frac{\pi}{2}$

$\frac{\sin x + \sin 2x}{\sin x} - \sin^2 x = \cos^2 x \Rightarrow \frac{\sin x}{\sin x} + 1 = 1 \Rightarrow \frac{\sin x}{\sin x} = 0$
 $\Rightarrow \sin x = 0 \Rightarrow x = k\pi \Rightarrow x = \frac{k\pi}{2}$
 $\Rightarrow x = \frac{k\pi}{2} + \frac{\pi}{2}$

k	0	1	2	3	4	5	6	7	8
x	0	$\frac{\pi}{2}$	$\frac{\pi}{2}$	$\frac{3\pi}{2}$	π	$\frac{5\pi}{2}$	$\frac{3\pi}{2}$	$\frac{7\pi}{2}$	2π

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$$\tan\left(\frac{\pi}{\varepsilon} - \alpha\right) = \frac{1 - \tan \alpha}{1 + \tan \alpha} = \tan \pi \alpha$$

$$\Rightarrow \frac{\pi}{\varepsilon} - \alpha = \pi \alpha + k\pi \Rightarrow \frac{\pi}{\varepsilon} = 2\pi \alpha + k\pi \Rightarrow \alpha = \frac{\pi}{2\varepsilon} - \frac{k\pi}{2}$$

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$$\text{ع1/} \quad \sin^{\varepsilon} \alpha - \cos^{\varepsilon} \alpha = 0$$

$$0 \rightarrow 0 - 1 = -1 \quad \times$$

$$\frac{\pi}{\varepsilon} \rightarrow 1 - 0 = 1 \quad \checkmark$$

$$\pi \rightarrow 0 - 1 = -1 \quad \times$$

$$\frac{\pi \varepsilon}{\varepsilon} \rightarrow 1 - 0 = 1 \quad \checkmark$$

$$\pi \varepsilon \rightarrow 0 - 1 = -1 \quad \times$$

$$\text{ع2/} \quad \sin^{\pi} \alpha - \cos^{\pi} \alpha = -1$$

$$0 \rightarrow 0 - (+1) = -1 \quad \checkmark$$

$$\frac{\pi}{\varepsilon} \rightarrow 1 - 0 = +1 \quad \times$$

$$\pi \rightarrow 0 - (-1) = +1 \quad \times$$

$$\frac{\pi \varepsilon}{\varepsilon} \rightarrow -1 + 0 = -1 \quad \checkmark$$

$$\pi \varepsilon \rightarrow 0 - (+1) = -1 \quad \checkmark$$

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