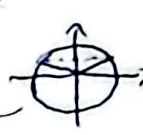
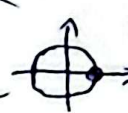


الف) $\cos^2 x = 2 \sin x - 1 \rightarrow 2 \sin^2 x + 2 \sin x - 2 = 0$
 $1 - 2 \sin^2 x$
 $\sin x = \frac{1}{2} \rightarrow$ 
 $x = 2k\pi + \frac{\pi}{6}, 2k\pi + \frac{5\pi}{6}$

ب) $\cos^2 x + \cos x - 2 = 0 \rightarrow 2 \cos^2 x + \cos x - 2 = 0$
 $2 \cos^2 x - 1$
 $\cos x = -1 \rightarrow$ 
 $x = 2k\pi$

الف) $\sin^2 x - \cos^2 x = \sin^2 x$
 $-\cos^2 x$
 $2 \sin^2 x \cos^2 x$
 $-1 = 2 \sin^2 x \rightarrow \sin^2 x = -\frac{1}{2} \rightarrow 2x = 2k\pi - \frac{\pi}{2}, 2k\pi - \frac{3\pi}{2}$
 $x = k\pi - \frac{\pi}{4}, k\pi - \frac{3\pi}{4}$

ب) $2 \cos^2 x + 2 \sin x \cos x = 1$
 $\cos^2 x + \sin^2 x$
 $\cos^2 x + \sin^2 x = 0 \rightarrow \cos^2 x = -\sin^2 x \rightarrow \cos^2 x = \sin^2 x$
 $\cos^2 x = \cos^2(\frac{\pi}{2} - x) \rightarrow 2x = 2k\pi \pm (\frac{\pi}{2} - x) \rightarrow x = k\pi - \frac{\pi}{6}$

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

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

الف) $\cos(\frac{\pi}{4} + x) \cos(x - \frac{\pi}{4}) = \frac{1}{2}$
 $\cos(\frac{\pi}{4} + x - \frac{\pi}{4})$
 $-\sin(x - \frac{\pi}{4})$
 $2 \sin(\frac{\pi}{4} - x) = 1$
 $\frac{2 \sin(\frac{\pi}{4} - x)}{2 \cos(x)}$
 $\cos^2 x = \frac{1}{2}$
 $x = k\pi \pm \frac{\pi}{4}$

ب) $\cos(2x - \frac{\pi}{4}) = -\frac{\sin^2 x}{\sin^2 x}$
 $\frac{\sin^2 x}{\cos(\frac{\pi}{4} + x)}$
 $2x - \frac{\pi}{4} = 2k\pi - \frac{\pi}{4} - 2x$
 $4x = 2k\pi \rightarrow x = k\pi$

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

$$\pi - (-\pi) = 2\pi$$

$$\frac{\sin \frac{x}{\pi}}{1 + \cos \frac{x}{\pi}} = \frac{1}{\sin \frac{x}{\pi}} + \cot \frac{x}{\pi}$$

$$\tan \frac{x}{\pi}$$

$$\rightarrow \tan \frac{x}{\pi} = \cot \frac{x}{\pi} \rightarrow \frac{x}{\pi} = \frac{k\pi}{\pi} + \frac{\pi}{\pi}$$

$$\downarrow$$

$$x = \pi k \pi + \pi$$

$$\downarrow$$

$$x \in [-\pi, \pi]$$

$$x_{\max} = \pi$$

$$x_{\min} = -\pi$$

$$\left. \begin{array}{l} \sin \frac{x}{\pi} \neq 0 \rightarrow \frac{x}{\pi} \neq k\pi \rightarrow x \neq \pi k\pi \\ \cos \frac{x}{\pi} \neq -1 \rightarrow \frac{x}{\pi} \neq \pi k \pi + \pi \rightarrow x \neq \pi k \pi + \pi \end{array} \right\} \rightarrow \boxed{x = \pi k \pi + \pi}$$

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

$$\downarrow$$

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

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

$$\rightarrow \cos 2x = -1 \rightarrow 2x = \pi k \pi + \pi$$

$$\rightarrow \sin x = 0 \rightarrow \boxed{x = k\pi} \quad , \quad x = \frac{\pi k \pi}{\pi} + \frac{\pi}{\pi}$$

$$x \in [0, 2\pi]$$

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

$$\text{جواب}$$

$$\frac{1 - \tan x}{1 + \tan x} = \tan 2x \rightarrow \frac{\cos x - \sin x}{\sin x + \cos x} = \frac{\sin 2x}{\cos 2x}$$

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

$$\rightarrow \cos x = 0 \rightarrow x = \pi k \pi + \frac{\pi}{2} \rightarrow \boxed{\frac{k\pi}{\pi} + \frac{\pi}{\pi} = x}$$

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

$$\sqrt{\sin^2 x + 2 \sin x \cos x + \cos^2 x}$$

$$\sin x + \cos x$$

$$\sqrt{2} \sin(x + \frac{\pi}{4})$$

$$\sqrt{2} \sin(x + \frac{\pi}{4}) = \sqrt{2} \cos x$$

$$\cos(\frac{\pi}{4} - x)$$

$$\downarrow$$

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

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

$$x = \{\frac{\pi}{4}, \frac{9\pi}{4}\}$$

$$x \in [0, \pi]$$

$$\boxed{x = \frac{\pi k \pi}{\pi} + \frac{\pi}{\pi}}$$

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

$$x \in [0, 2\pi]$$

$$\boxed{x = \{\frac{\pi}{\pi}, \frac{3\pi}{\pi}\}}$$

$$\text{جواب}$$

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

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

$$\sin x = \pm \cos x$$

$$x = \{0, \frac{3\pi}{4}, \frac{5\pi}{4}, 2\pi\}$$

$$\text{جواب}$$