

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

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

$$\Rightarrow \cos x = -2 \text{ و } \frac{1}{2}$$

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

$$\cos^2 x - \sin^2 x = 3\sin x - 1 \quad (1)$$

$$1 - \sin^2 x$$

$$\Rightarrow 2\sin^2 x + 3\sin x - 2 = 0$$

$$\sin^2 x + 3\sin x - 2 = 0$$

$$\Rightarrow \sin x = \frac{1}{2} \text{ و } -2$$

$$\Rightarrow x = 2k\pi + \frac{\pi}{6} \text{ و } 2k\pi + \frac{5\pi}{6}$$

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

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

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

$$\Rightarrow x = 2k\pi + \frac{\pi}{4} \text{ و } 2k\pi + \frac{3\pi}{4}$$

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

(ب)

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

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

$$\sin^2 x = -\frac{1}{2}$$

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

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

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

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

$$\Rightarrow \sin x = 0 \text{ و } \cos x = 1$$

$$\Rightarrow \tan x = -1$$

$$x = 2k\pi + \frac{3\pi}{4} \text{ و } 2k\pi + \frac{\pi}{4}$$

$$\frac{2\cos^2 x + \cos x}{\sin^2 x} = \frac{1}{\sin^2 x} \quad (2)$$

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

$$\Rightarrow \cos x = -1 \text{ و } \frac{1}{2}$$

$$\sin x \neq 0$$

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

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

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

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

$$\Rightarrow x = 2k\pi - \frac{\pi}{4} \text{ و } \frac{\pi}{4}$$

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

(ب)

$$\cos \left(\frac{\pi}{4} + x \right) \cos \left(\frac{\pi}{4} - x \right) = \frac{1}{4} \quad (3)$$

$$\cos \left(\frac{\pi}{4} + x \right) \sin \left(\frac{\pi}{4} + x \right) = \frac{1}{4}$$

$$\frac{\sin 2 \left(\frac{\pi}{4} + x \right)}{2} = \frac{1}{4}$$

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

$$\frac{2\sin^2 x \cos^2 x + \sin^2 x}{\sin^2 x} = \sin^2 x + 2\cos^2 x$$

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

$$2\cos^2 x = 0$$

$$\Rightarrow x = 2k\pi + \pi \text{ و } 2k\pi$$

$$\Rightarrow x = k\pi + \frac{\pi}{2} \text{ و } k\pi$$

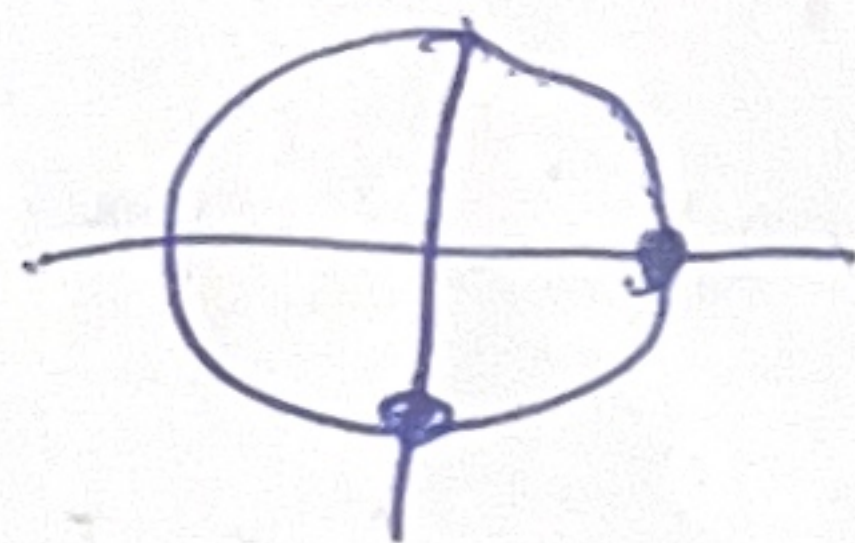
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$\frac{x}{r} = \alpha \Rightarrow \frac{1 + \cos \alpha}{\sin \alpha} = \frac{\sin \alpha}{1 + \cos \alpha}$ $\Rightarrow \sin^2 \alpha = (1 + \cos \alpha)^2 \Rightarrow 1 - \cos^2 \alpha = \cos^2 \alpha + 2 \cos \alpha + 1$ $\Rightarrow 2 \cos \alpha (1 + \cos \alpha) = 0 \Rightarrow \cos \alpha = -1 \text{ (X) } \text{ or } 1 + \cos \alpha = 0 \checkmark$ $\Rightarrow \frac{x}{r} = \frac{\pi}{r} \Rightarrow x = \pi, x = -\frac{\pi}{r} \Rightarrow x = -\pi$ $\Rightarrow \pi - (-\pi) = 2\pi = 2\pi$	
$\sin^2 x - 1 = \sin^2 x + \cos^2 x$ $\cos^2 x - 1 = \sin^2 x + \cos^2 x \Rightarrow -\sin^2 x = \sin^2 x + \cos^2 x$ $\Rightarrow \sin^2 x (\cos^2 x + 1) = 0 \Rightarrow \sin^2 x (\cos^2 x + 1) = 0$ $\Rightarrow x = 0, \pi, 2\pi \quad (\because \sin x = 0)$ $\text{or } x = (2k+1)\pi \Rightarrow x = \frac{(2k+1)\pi}{r} \Rightarrow x = \frac{\pi}{r}, \frac{3\pi}{r}$	
$\Rightarrow x = \left\{ 0, \frac{\pi}{r}, \pi, \frac{3\pi}{r}, 2\pi \right\} \Rightarrow \omega = \text{عدد بواب}$	✓
$\frac{1 - \tan x}{1 + \tan x} = \frac{\tan \frac{\pi}{r} - \tan x}{1 + \tan \frac{\pi}{r} \tan x} = \tan \left(\frac{\pi}{r} - x \right)$ $\Rightarrow \tan \left(\frac{\pi}{r} - x \right) = \tan k\pi$ $k\pi = k\pi + \frac{\pi}{r} - x \Rightarrow x = \frac{k\pi}{r} + \frac{\pi}{r}$	✓
$1 + \sin^2 x = r \cos^2 x = r - r \sin^2 x$ $r \sin^2 x + \sin^2 x - 1 = 0 \Rightarrow \sin^2 x = \frac{1}{r}$ $\text{, } \sin^2 x = 1 \Rightarrow x = \frac{\pi}{r}, \frac{3\pi}{r}$	9

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$$\sin x = \cos x \quad \Rightarrow \quad \sin x - \cos x = 0$$

$$\Rightarrow \sin x = \cos x$$



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

$$x = \frac{5\pi}{4}$$

$$\cos 2x = 1$$

$$\cos 2x = -1$$

$$2x = 2k\pi + \pi$$

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