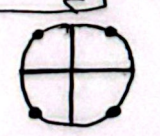


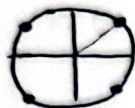
(ب) $\cos 2\alpha = \cos^2 \alpha - 1$ / $\cos^2 \alpha + \cos 2\alpha - 1 = 0$ $\cos \alpha = 1 \rightarrow \boxed{\alpha = 2k\pi}$ $\cos \alpha = \frac{1}{2} \rightarrow \alpha = \frac{\pi}{3}, \frac{5\pi}{3}$	(الف) $\cos 2\alpha = 1 - \sin^2 \alpha$ $\sin^2 \alpha + \sin \alpha - 1 = 0$ $\sin \alpha = \frac{-1 \pm \sqrt{5}}{2}$ $(\sin \alpha - 1)(\sin \alpha + 2) = 0$ $\sin \alpha = \frac{1}{2}$ $\alpha = 2k\pi + \frac{\pi}{6}$ $\alpha = 2k\pi + \frac{5\pi}{6}$	1
(الف) $\sin \frac{\pi}{2} - \cos \frac{\pi}{2} = -\cos 2\alpha = \sin 2\alpha \cos 2\alpha$ $\cos 2\alpha (1 + \sin 2\alpha) = 0$ $\cos 2\alpha = 0$ ① $2\alpha = k\pi$ $\alpha = \frac{k\pi}{2}$ $\sin 2\alpha = -1$ $2\alpha \rightarrow 2k\pi - \frac{\pi}{2}$ $\alpha = k\pi - \frac{\pi}{4}$ ② $\alpha = k\pi - \frac{5\pi}{4}$	(ب) $\cos^2 \alpha + \sin^2 \alpha \cos \alpha - \cos^2 \alpha - \sin^2 \alpha = 0$ $\cos 2\alpha + \sin 2\alpha = 0$ $\tan 2\alpha = -1$ $2\alpha = k\pi + \frac{3\pi}{4}$ $\alpha = \frac{k\pi}{2} + \frac{3\pi}{8}$	2
(الف) $\frac{1}{\sin} [\cos(\cos+1) - 1] = 0$ $\cos = -1 \rightarrow 2k\pi + \pi$ $\sin = 0$ $\cos = \frac{1}{2} \rightarrow \alpha = 2k\pi \pm \frac{\pi}{3}$	(ب) $\sin^2 \alpha - \sin \alpha - \cos^2 \alpha - \sin \alpha \cos \alpha + \cos^2 \alpha = 0$ $-\cos^2 \alpha - \sin \alpha \cos \alpha = 0$ $-\cos \alpha (\cos \alpha + \sin \alpha) = 0$ $-\cos \alpha = 0$ $\alpha = k\pi$ ① $\cos \alpha + \sin \alpha = 0 \rightarrow \tan \alpha = -1$ $\alpha = k\pi + \frac{3\pi}{4}$ ②	3
(ب) $-\sin 2\alpha = -\cos(\alpha + \frac{\pi}{2})$ $\sin(-2\alpha) = \cos(\alpha + \frac{\pi}{2})$ $2\alpha - \frac{\pi}{2} = \alpha + \frac{\pi}{2}$ $\alpha = \pi$ $2\alpha = \pi - \alpha - \frac{\pi}{2}$ $3\alpha = \frac{\pi}{2}$ $\alpha = \frac{\pi}{6}$	(الف) $\cos(\alpha - \frac{\pi}{2}) = \cos(\frac{\pi}{2} - \alpha) = \sin(\frac{\pi}{2} + \alpha)$ $\sin(\frac{\pi}{2} + \alpha) = \frac{1}{2}$ $-\cos \alpha = \frac{1}{2}$ $\cos \alpha = -\frac{1}{2}$ $\alpha = 2k\pi \pm \frac{2\pi}{3}$ $\alpha = k\pi \pm \frac{\pi}{3}$	4
$\frac{\sin \frac{\pi}{2} + \sin \frac{\pi}{2} - \sin \frac{\pi}{2}}{\sin \frac{\pi}{2}} = 0$ $-\sin^2 \alpha - \cos^2 \alpha = -1$ $\sin \frac{\pi}{2} = 1$ $\sin \frac{\pi}{2} = 1$ $\alpha = k\pi$ $\alpha = \frac{k\pi}{2}$ $\alpha = k\pi \pm \frac{\pi}{2}$ $\alpha = \frac{k\pi}{2}$ 		5

$$\frac{\sin \frac{x}{2}}{1 + \cos \frac{x}{2}} = \tan \frac{x}{4} \quad \frac{1}{\sin \frac{x}{2}} + \frac{\cos \frac{x}{2}}{\sin \frac{x}{2}} = \frac{1 + \cos \frac{x}{2}}{\sin \frac{x}{2}} = \cot \frac{x}{4}$$

$$\tan \frac{x}{4} - \cot \frac{x}{4} = 0 \quad \tan \frac{x}{4} = 1$$

$$\boxed{x = 4k\pi}$$

$$\tan \frac{x}{4} = \pm 1$$



$$\frac{x}{4} = k\pi \pm \frac{\pi}{4}$$

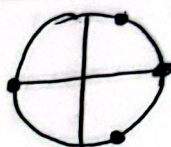
$$x = 4k\pi \pm \pi \quad \text{for } \sin \frac{x}{4}, \sin \frac{x}{2} \neq 0$$

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

$$\boxed{\frac{3\pi}{4}, \pi, \frac{5\pi}{4}}$$

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

فأجاب



$$\sin^2 x = 0 \quad x = k\pi \quad \text{①} \quad x = \frac{4k\pi}{2} + \frac{\pi}{2}$$

$$\cos 2x = -1$$

$$2x = 2k\pi + \pi \quad \text{②}$$

جواب مضاعف = π

$$\frac{1 - \tan x}{1 + \tan x} = \frac{1}{\tan(x + \frac{\pi}{4})} = \cot(x + \frac{\pi}{4}) = \tan(\frac{\pi}{2} - (x + \frac{\pi}{4})) = \tan(\frac{\pi}{4} - x)$$

$$x + x + \frac{\pi}{4} = \frac{\pi}{4} \quad \text{با بدست می آید}$$

$$2x = \frac{\pi}{4} \Rightarrow x = \frac{\pi}{8} \Rightarrow \boxed{x = k\pi \pm \frac{\pi}{8}}$$

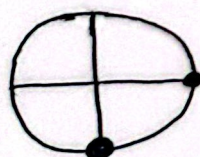
$$\sqrt{1 + \sin 2x} = \sqrt{\sin^2 x + \cos^2 x + 2 \sin x \cos x} = \sqrt{(\sin x + \cos x)^2} = |\sin x + \cos x| \quad \cos^2 x - \sin^2 x$$

$$|\sin x + \cos x| \rightarrow [0, \frac{\pi}{4}] = \sin x + \cos x \Rightarrow (\sin x + \cos x) = \sqrt{2} (\sin(\frac{\pi}{4} + x)) \quad \text{① جواب}$$

$$\frac{\sqrt{2}}{2} = \cos x - \sin x \Rightarrow \sin(\frac{\pi}{4} - x) = \frac{1}{\sqrt{2}} \quad \sin(\frac{\pi}{4} - x) = \frac{1}{\sqrt{2}} \quad \text{② جواب}$$

$$[\frac{3\pi}{4}, \pi] \rightarrow -\sin x - \cos x = \sqrt{2} (\sin(\frac{\pi}{4} + x)) \quad \frac{\pi}{4} = \text{جواب ①}$$

$$\frac{-\sqrt{2}}{2} = -\sqrt{2} \sin(\frac{\pi}{4} - x) \quad \sin(\frac{\pi}{4} - x) = \frac{1}{2} \rightarrow \text{در بازه } \frac{3\pi}{4}, \pi \text{ صحت نمی کند}$$



$$2\pi, 0, \frac{3\pi}{4} \quad \text{جواب ③}$$

$$\sin^2 x - \cos^2 x = -\cos 2x \quad \text{الف}$$

$$\cos 2x = -1$$

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



$$\frac{\pi}{2}, \frac{3\pi}{2} \quad \text{جواب ④}$$