

$$\textcircled{1} \quad \cos 2\alpha = 3 \sin \alpha - 1 \Rightarrow 0 = 2 \sin^2 \alpha + 3 \sin \alpha - 2$$

$$(2 \sin \alpha + 1)(\sin \alpha - 1) = 0$$

۲. آزمون ضمیمه خوب نوشتی $1 - 2 \sin^2 \alpha$

$$\sin \alpha = \frac{1}{2}$$

$$\text{الف) } \alpha = 2K\pi + \frac{\pi}{6} \quad \alpha = 2K\pi + \frac{5\pi}{6} \quad \leftarrow \text{جواب}$$

$$\text{ب) } \cos 2\alpha + \cos \alpha - 2 = 0 \Rightarrow 2 \cos^2 \alpha - 1 + \cos \alpha - 2 = 0$$

$$2 \cos^2 \alpha + \cos \alpha - 3 = 0 \Rightarrow (\cos \alpha + 3)(\cos \alpha - 1) = 0$$

$$\cos \alpha = 1 \Rightarrow \alpha = 2K\pi \quad \leftarrow \text{جواب}$$

$$\textcircled{2} \quad \text{الف) } \sin^2 \alpha - \cos^2 \alpha = \sin \alpha \cos \alpha$$

$$-\cos 2\alpha = \frac{1}{2} \sin 2\alpha$$

$$\sin 2\alpha = -\frac{1}{2} \Rightarrow \begin{cases} 2\alpha = 2K\pi + \frac{7\pi}{6} \Rightarrow \alpha = K\pi + \frac{7\pi}{12} \\ 2\alpha = 2K\pi + \frac{11\pi}{6} \Rightarrow \alpha = K\pi + \frac{11\pi}{12} \end{cases} \quad \leftarrow \text{جواب}$$

$$\text{ب) } 1 + \cos 2\alpha + \sin 2\alpha = 1$$

$$\cos 2\alpha + \sin 2\alpha = 0 \Rightarrow \sqrt{2} \sin(2\alpha + \frac{\pi}{4}) = 0$$

$$\Rightarrow \begin{cases} 2\alpha + \frac{\pi}{4} = 2K\pi \Rightarrow \alpha = K\pi - \frac{\pi}{4} \\ 2\alpha + \frac{\pi}{4} = 2K\pi + \pi \Rightarrow \alpha = K\pi + \frac{3\pi}{4} \end{cases} \quad \leftarrow \text{جواب}$$

$$\textcircled{3} \quad \cot \alpha (2 \cos \alpha + 1) = \frac{1}{\sin \alpha} \xrightarrow{\sin \alpha \neq 0} \cos \alpha (2 \cos \alpha + 1) = 1$$

$$\Rightarrow 2 \cos^2 \alpha + \cos \alpha - 1 = 0 \Rightarrow (\cos \alpha + 2)(\cos \alpha - 1) = 0$$

$$\cos \alpha = -1 \rightarrow \sin \alpha = 0 \quad \text{غیر مجاز}$$

$$\cos \alpha = 1 \rightarrow \sin \alpha = 0 \quad \text{غیر مجاز}$$

$$\alpha = 2K\pi + \frac{\pi}{2} \quad \leftarrow \text{جواب}$$

$$(4) \tan \frac{\pi}{x} = \frac{1 + \cos \frac{\pi}{x}}{\sin \frac{\pi}{x}} \rightarrow \frac{\sin \frac{\pi}{x}}{\cos \frac{\pi}{x}} = \frac{1 + \cos \frac{\pi}{x}}{\sin \frac{\pi}{x}}$$

$$\Rightarrow \cancel{\sin \frac{\pi}{x}} = \cancel{\cos \frac{\pi}{x}} \Rightarrow \sin \frac{\pi}{x} = \pm \cos \frac{\pi}{x}$$

$$\hookrightarrow \tan \frac{\pi}{x} = \pm 1 \rightarrow \frac{\pi}{x} = K\pi \pm \frac{\pi}{2} \Rightarrow \boxed{x = \frac{K\pi \pm \pi}{2}}$$

$$- \pi, \pi \rightarrow |\pi - (-\pi)| = 2\pi \text{ جواب}$$

$$(5) \cos^2 u - \sin^2 u \cos^2 u = 1 \div \sin^2 u \rightarrow \cot^2 u - \cos^2 u = 1$$

$$\rightarrow \cot^2 u - \cos^2 u = 1 + \cot^2 u$$

$$\cos^2 u = -1 \rightarrow K\pi = 2K\pi \pm \pi \Rightarrow \boxed{u = \frac{2K\pi \pm \pi}{2}}$$

K	0	1	2	3
u	$\frac{\pi}{2}$	π	$\frac{3\pi}{2}$	x

$$\sin = 0$$

$$\rightarrow 0, \pi, 2\pi \rightarrow K=2 \text{ جواب}$$

$$(6) \frac{1 - \tan u}{1 + \tan u} = \tan \pi u$$

$$1 + \tan u \rightarrow \tan \frac{\pi}{2}$$

$$\hookrightarrow \tan(A-B) = \frac{\tan A - \tan B}{1 + \tan A \tan B}$$

$$\Rightarrow \tan\left(\frac{\pi}{2} - u\right) = \tan \pi u$$

$$\hookrightarrow \pi u = K\pi + \frac{\pi}{2} - u \Rightarrow \boxed{u = \frac{K\pi}{2} + \frac{\pi}{4}}$$

$$(7) \sin u + \cos u = \sqrt{2} \cos \pi u \rightarrow \sin\left(u + \frac{\pi}{2}\right) = \sin\left(\frac{\pi}{2} - \pi u\right)$$

$$\cdot \sqrt{2} \sin\left(u + \frac{\pi}{2}\right) \Rightarrow$$

$$\Rightarrow u + \frac{\pi}{2} = 2K\pi + \frac{\pi}{2} - \pi u \quad \bigg| \quad u + \frac{\pi}{2} = 2K\pi + \frac{\pi}{2} + \pi u$$

$$\hookrightarrow \pi u = 2K\pi + \frac{\pi}{2}$$

$$\hookrightarrow -\pi u = 2K\pi + \frac{\pi}{2}$$

$$\hookrightarrow \boxed{u = \frac{2K\pi}{2} + \frac{\pi}{4}}$$

$$\hookrightarrow \boxed{u = -2K\pi - \frac{\pi}{4}}$$

K	0	1
u	$\frac{\pi}{4}$	$\frac{5\pi}{4}$

$$\text{جوابها} \rightarrow \frac{\pi}{4}, \frac{5\pi}{4}$$

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$$(K) \rightarrow \frac{\sin^r \alpha + \cos^r \alpha}{1} + \sin^r \alpha - \sin \alpha \cos \alpha = r$$

$$\Rightarrow \frac{\sin^r \alpha}{\sin^r \alpha} - \frac{\sin \alpha \cos \alpha}{\sin^r \alpha} = \frac{1}{\sin^r \alpha} \Rightarrow 1 - \cot \alpha = 1 + \cot^r \alpha$$

$$\Rightarrow \cot \alpha = 0 \text{ , } -1 \left\{ \begin{array}{l} \alpha = K\pi + \frac{\pi}{r} \quad \text{و} \quad \alpha = K\pi + \frac{r\pi}{r} \end{array} \right. \leftarrow \text{جواب}$$

$$(K) \cos\left(\frac{\pi}{r} + \alpha\right) \cos\left(\alpha - \frac{\pi}{r}\right) = \frac{1}{r}$$

$$\sin\left(\frac{\pi}{r} - \left(\frac{\pi}{r} + \alpha\right)\right)$$

$$\sin\left(\frac{\pi}{r} - \alpha\right) \sim -\sin\left(\alpha - \frac{\pi}{r}\right) \cdot \cos\left(\alpha - \frac{\pi}{r}\right) = \frac{1}{r}$$

$$\Rightarrow -\frac{1}{r} \sin\left(\alpha - \frac{\pi}{r}\right) = \frac{1}{r} \rightarrow \cos^r \alpha = \frac{1}{r} \quad \text{P}$$

$$\left\{ \begin{array}{l} \alpha = K\pi \pm \frac{\pi}{r} \end{array} \right. \leftarrow \text{جواب}$$

$$\rightarrow \cos\left(r\alpha - \frac{\pi}{r}\right) = -\cos\left(\frac{\pi}{r} - r\alpha\right) = \cos\left(r\alpha + \frac{\pi}{r}\right)$$

$$\Rightarrow r\alpha + \frac{\pi}{r} = rK\pi \pm \left(\frac{\pi}{r} - r\alpha\right)$$

$$\cos r\alpha = rK\pi + \frac{\pi}{r} - r\alpha - \frac{\pi}{r} \sim r\alpha = rK\pi - \frac{\pi}{r}$$

$$\alpha = \frac{rK\pi}{r} - \frac{\pi}{r^2}$$

$$(Q) \frac{\sin^r r\alpha \cos^r r\alpha + \sin^r r\alpha}{\sin^r \alpha} - \sin^r \alpha = \cos^r \alpha$$

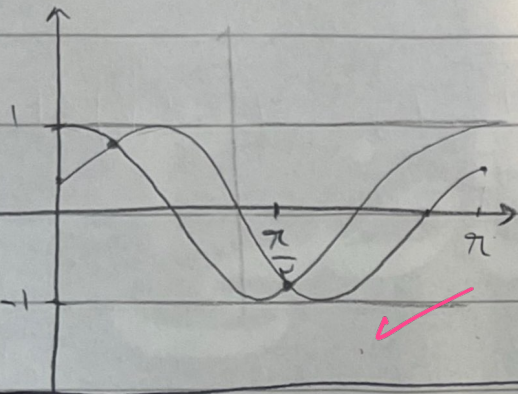
$$\Rightarrow r \cos^r r\alpha + 1 = 1 \rightarrow \cos^r r\alpha = 0 \rightarrow r\alpha = rK\pi \quad \text{P}$$

$$\Rightarrow \alpha = K\pi \quad \left\{ \begin{array}{l} \alpha = K\pi \pm \frac{\pi}{r} \end{array} \right.$$

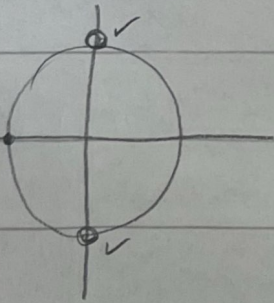
$$\sin \theta + \frac{\pi}{2} = \cos \theta$$

ادامہ سوال ۹

جواب ۲



10) الف) $\sin^2 \theta - \cos^2 \theta = 1 \Rightarrow \cos^2 \theta = -1$

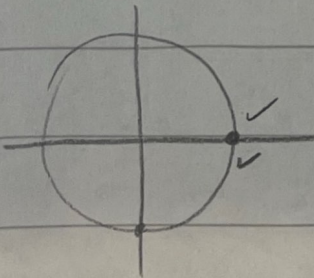


$$\theta = \frac{\pi}{2}, \frac{3\pi}{2}$$

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ب) $\sin^2 \theta - \cos^2 \theta = -1$



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

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