

الف) $\cos 2m = 3 \sin m - 1$

$1 - 2 \sin^2 m$

$2 \sin^2 m + 3 \sin m - 2 = 0 \rightarrow \sin^2 m + 3 \sin m - 2 = 0$

$\sin m = -2$ و $\cos m = \frac{1}{2}$ و $\sin m = \frac{1}{2}$ و $\cos m = -2$

$\sin m = \sin \frac{\pi}{6}$
 $m = 2k\pi + \frac{\pi}{6}$
 $m = 2k\pi + \frac{5\pi}{6}$
 $k \in \mathbb{Z}$

ب) $\cos 2m + \cos m - 2 = 0$

$2 \cos^2 m + \cos m - 2 = 0 \rightarrow$ جمع ضرایب صفر

$\cos m = 1$ $\cos m = -\frac{2}{3}$
 $\downarrow$ $\cos 0$ $\rightarrow$ $\cos \pi$

$\cos m = \cos \pi \rightarrow m = 2k\pi \pm \pi$

$\{m = 2k\pi \mid k \in \mathbb{Z}\}$

الف) $\sin^2 m - \cos^2 m = \sin^2 m$

$(\sin^2 m - \cos^2 m) (\sin^2 m + \cos^2 m) = \sin^2 m$
 $-\cos^2 m = 1$

$-\cos^2 m = 2 \sin^2 m \cos^2 m$ ① $\cos^2 m = 0$

$\sin^2 m = -\frac{1}{2} \Rightarrow \sin^2 m = \sin^2(-\frac{\pi}{4})$

$m = 2k\pi - \frac{\pi}{4} \rightarrow m = k\pi - \frac{\pi}{4}$
 $m = 2k\pi + \pi + \frac{\pi}{4} \rightarrow m = k\pi + \frac{5\pi}{4}$
 $m = 2k\pi + \frac{\pi}{4}$
 $m = k\pi \pm \frac{\pi}{4}$

ب) $2 \cos^2 m + 2 \sin m \cos m = 1$

$2 \cos^2 m - 1 + \sin 2m = 0 \rightarrow \sin 2m = -\cos 2m$

$\div \cos 2m$ $\tan 2m = -1 \rightarrow 2m = k\pi - \frac{\pi}{4}$

$m = \frac{k\pi}{2} - \frac{\pi}{4}$

$k \in \mathbb{Z}$

الف) $\frac{\cos m \cot m (2 \cos m + 1)}{\sin m} = \frac{1}{\sin m} + \sin m \neq 0$

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

$2 \cos^2 m = -1$ $\cos m = \frac{1}{2} \rightarrow \cos m = \cos \frac{\pi}{3}$

$m = 2k\pi \pm \frac{\pi}{3}$ ①

$\cos m = \cos \pi$

$m = 2k\pi \pm \pi = \pi(2k \pm 1)$ ②

ب) $2 \sin^2 m - \sin m \cos m + \cos^2 m = 2$

$\sin^2 m + \sin^2 m + \cos^2 m - \sin m \cos m = 2$

$-\sin m \cos m = \cos^2 m$ $\div \cos m$ $-\sin m = \cos m$

$\cos m = 0 \rightarrow m = k\pi + \frac{\pi}{2}$ $\cot m = -1$

$m = k\pi - \frac{\pi}{4}$

الف) $\cos(\frac{\pi}{6} + m) \cos(\frac{\pi}{6} + m) = \frac{1}{2}$

$\cos m = \cos -m$

$\cos(\frac{\pi}{6} + m) \sin(\frac{\pi}{6} + m) = \frac{1}{2}$ $\frac{\pi}{6} + m - \frac{\pi}{6} + m = \frac{\pi}{2}$

$\frac{1}{2} \sin(2m + \frac{\pi}{3}) = \frac{1}{2}$

$\cos 2m = \frac{1}{2} \rightarrow 2m = 2k\pi \pm \frac{\pi}{3}$ $m = k\pi \pm \frac{\pi}{6}$

ب) $\cos(m - \frac{\pi}{4}) = -\sin m$ $\cos(\frac{\pi}{4} + m)$

$\cos(m - \frac{\pi}{4}) = \cos(\frac{\pi}{4} + m)$ $\cos \frac{\pi}{4}$

۱) $m - \frac{\pi}{4} = 2k\pi + m + \frac{\pi}{4} \rightarrow 2k\pi + \frac{\pi}{2} = \frac{\pi}{4}$

۲) $m - \frac{\pi}{4} = 2k\pi - (\frac{\pi}{4} + m)$

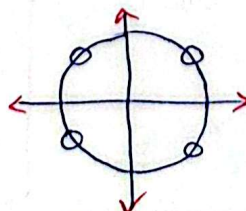
$m = 2k\pi + \frac{\pi}{4} - \frac{\pi}{4} \rightarrow m = 2k\pi$

$m = \frac{-\sqrt{2}\pi}{\sqrt{2}} + \frac{k\pi}{2}$ $k \in \mathbb{Z}$

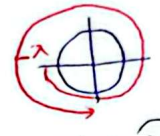
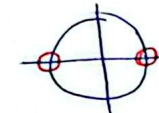
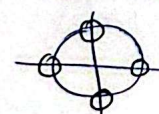
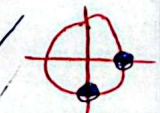
$\frac{\sin^2 m + \sin^2 m}{\sin^2 m} = \sin^2 m + \cos^2 m$

$2 \sin^2 m \cos^2 m + \sin^2 m = 1 \rightarrow 2 \cos^2 m + 1 = 1 \rightarrow \cos^2 m = 0 \rightarrow \cos^2 m = \cos^2 \frac{\pi}{2}$

$m = 2k\pi \pm \frac{\pi}{2} \rightarrow m = k\pi \pm \frac{\pi}{2}$



$\{\frac{\pi}{2}, \frac{3\pi}{2}, \frac{5\pi}{2}, \frac{7\pi}{2}, \dots\}$

$\frac{\sin \frac{\alpha}{r}}{1 + \cos \frac{\alpha}{r}} = \frac{1 + \cos \frac{\alpha}{r}}{\sin \frac{\alpha}{r}} \cdot \frac{1}{\frac{\sin \frac{\alpha}{r}}{1 + \cos \frac{\alpha}{r}}} = \cot \frac{\alpha}{r}$ $\tan \frac{\alpha}{r} = \cot \frac{\alpha}{r}$ $\tan \frac{\alpha}{r} = \tan \left(\frac{\pi}{r} - \frac{\alpha}{r} \right)$ $\frac{\alpha}{r} = k\pi + \frac{\pi}{r} - \frac{\alpha}{r} \rightarrow \frac{\alpha}{r} = k\pi + \frac{\pi}{r} \rightarrow \alpha = 2k\pi + \pi$	$\tan \alpha = \frac{1 - \cos \alpha}{\sin \alpha} = \frac{\sin \alpha}{1 + \cos \alpha}$ جوابها  منبرای هر λ $\alpha = \pi, 3\pi, 5\pi, \dots$ $-\pi, -3\pi, -5\pi, \dots$ $\lambda - (-\lambda) = 2\lambda$
$\cos^2 \alpha - \sin^2 \alpha \cos^2 \alpha = 1 \rightarrow \sin^2 \alpha = 0 \rightarrow \sin \alpha = 0 \rightarrow \alpha = k\pi$ $1 - \cos^2 \alpha = -\sin^2 \alpha \cos^2 \alpha \rightarrow \cos^2 \alpha = -1 \rightarrow \cos^2 \alpha = \cos^2 \pi$ $\mu \alpha = 2k\pi \pm \pi \rightarrow \alpha = \frac{2k\pi \pm \pi}{2}$ جوابها $k \in \mathbb{Z}$ $\alpha = 0, \pi, 2\pi, \dots$ جواب دارد.	
$\frac{1 - \tan \alpha}{1 + \tan \alpha} = \tan \mu \alpha$ $\frac{\cos \alpha - \sin \alpha}{\cos \alpha + \sin \alpha} = \frac{\sqrt{r} \sin(-\alpha + \frac{\pi}{2})}{\sqrt{r} \sin(\alpha + \frac{\pi}{2})} = \tan(\frac{\pi}{2} - \alpha) = \tan \mu \alpha$ $-\alpha + \frac{\pi}{2} + \alpha + \frac{\pi}{2} = \frac{\pi}{r}$ $\cos(\frac{\pi}{2} - \alpha)$ $\mu \alpha = k\pi - \alpha + \frac{\pi}{2}$ $r \alpha = k\pi + \frac{\pi}{2}$ $\alpha = \frac{k\pi}{r} + \frac{\pi}{2r}$	ا
$\sqrt{1 + \sin \mu \alpha} = \sqrt{r} \cos \mu \alpha$ $\sqrt{(\sin \alpha + \cos \alpha)^2}$ $ \sin \alpha + \cos \alpha = \sqrt{r} \cos \mu \alpha$ $\sqrt{r} \sin(\alpha + \frac{\pi}{2}) = \sqrt{r} \cos \mu \alpha$	$\cos(\frac{\pi}{2} - \alpha) = \cos \mu \alpha$ $k=0 \alpha = \frac{\pi}{2r} \quad k=1 \alpha = \frac{3\pi}{2r}$ $\mu \alpha = 2k\pi \pm (\frac{\pi}{2} - \alpha)$ $\alpha = \frac{2k\pi}{3} + \frac{\pi}{6}$ $\rightarrow ① \mu \alpha = 2k\pi + \frac{\pi}{2} - \alpha \rightarrow r \alpha = 2k\pi + \frac{\pi}{2}$ $② \mu \alpha = 2k\pi + \alpha - \frac{\pi}{2} \rightarrow \alpha = 2k\pi - \frac{\pi}{2}$ در جواب بازه $[0, \pi]$ ، در هر سوال در جایگاه خود
الف) $\sin^2 \alpha - \cos^2 \alpha = 1 \rightarrow \cos^2 \alpha = -1$ $\cos^2 \alpha = \cos^2 \pi \rightarrow \mu \alpha = 2k\pi \pm \pi$ $\rightarrow \alpha = k\pi \pm \frac{\pi}{r}$  جوابها $\left\{ \frac{\pi}{r}, \pi, \frac{\mu\pi}{r}, 2\pi \right\}$	ب) $\sin^2 \alpha - \cos^2 \alpha = -1$ ۱) $\sin \alpha = 0 \quad \cos \alpha = 1 \quad \checkmark$ ۲) $\sin \alpha = 1 \quad \cos \alpha = 0 \quad \times$ ۳) $\sin \alpha = 0 \quad \cos \alpha = -1 \quad \times$ ۴) $\sin \alpha = -1 \quad \cos \alpha = 0 \quad \checkmark$  ۱. $\left\{ \frac{\mu\pi}{r}, 2\pi \right\}$

$$\sqrt{1 + \sin 2m} = \sqrt{r} \cos 2m$$

عوارض

باید جواب داد

$$\sin 2m + \cos 2m = 1$$

راه دوم سوال 9

توان r

$$1 + \sin 2m = \underbrace{r \cos 2m}_{r(1 - \sin 2m)}$$

$$\rightarrow r \sin 2m + \sin 2m - 1 = 0 \quad \begin{cases} \sin 2m = \frac{1}{r} \\ \sin 2m = -1 \end{cases}$$

$$\sin 2m = \frac{1}{r} \rightarrow 2m = 2k\pi + \frac{\pi}{2} \rightarrow m = k\pi + \frac{\pi}{4} \quad \triangle$$

$$\sin 2m = -1 \rightarrow 2m = 2k\pi + \frac{3\pi}{2} \rightarrow m = k\pi + \frac{3\pi}{4} \quad \triangle$$

$$\sqrt{r} \cos 2m \geq 0 \rightarrow \cos 2m \geq 0$$

$$\textcircled{1} m = \frac{\pi}{4} \quad \text{و} \quad m = \frac{3\pi}{4} \rightarrow \text{جواب دارد} \quad \text{رابطه: } [0, \pi]$$