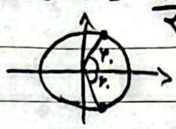
مانا کریمی

۱- $8\cos x - \tan^2 x = 1 \Rightarrow 8\cos x = 1 + \tan^2 x \Rightarrow 8\cos x = \frac{1}{\cos^2 x}$

$\Rightarrow 8\cos^3 x = 1 \Rightarrow \cos^3 x = \frac{1}{8} \Rightarrow \cos x = \frac{1}{2} \Rightarrow$ $x = 2k\pi \pm \frac{\pi}{3}$ ، دو جواب



۲-

۳-

۴- $\frac{1}{\cos 2x} + \frac{1}{\sin 4x} = 0 \rightarrow \frac{2\sin 2\alpha}{2\cos 2\alpha \sin 2\alpha} + \frac{1}{2\cos 2\alpha \sin 2\alpha} = 0$

$1 + 2\sin 2\alpha = 0 \Rightarrow \sin 2\alpha = \frac{-1}{2}$

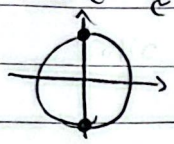
$\Rightarrow 2\alpha = 2k\pi - \frac{\pi}{6} \Rightarrow \alpha = k\pi - \frac{\pi}{12}$ و $2\alpha = 2k\pi - \frac{5\pi}{6} \Rightarrow \alpha = k\pi - \frac{5\pi}{12}$

$\tan 2\alpha \Rightarrow \tan 210° = \frac{\sqrt{3}}{3}$, $\tan 330° = \frac{-\sqrt{3}}{3} \Rightarrow \tan 2\alpha = \pm\frac{\sqrt{3}}{3} \leftarrow \frac{7\pi}{12}, \frac{11\pi}{12} \leftarrow [0, \pi]$ جواب های در بازه

۵-

$\cos\left(x-\frac{\pi}{2}\right)=\cos\left(\frac{\pi}{2}-x\right) \Rightarrow \sin^2\left(x+\frac{\pi}{6}\right)=1 \Rightarrow \sin\left(x+\frac{\pi}{6}\right)=\pm 1$ ـ۶

متمم‌اند



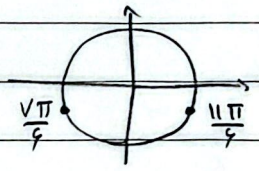
دارای دو جواب استاندارد $\rightarrow \boxed{\frac{\pi}{3}\ ,\ \frac{2\pi}{3}}$

$\sin x+\sqrt{3}\cos x=\sqrt{3} \xrightarrow{\div \sin} 1+\sqrt{3}\cot x=\frac{\sqrt{3}}{\sin x}$ ـ۷

$\Rightarrow \frac{\sqrt{3}-\sin x}{\sin x}=\frac{\sqrt{3}\cos x}{\sin x} \Rightarrow \sqrt{3}-\sin x=\sqrt{3}\cos x \xrightarrow{\text{توان ۲}} 3+\sin^2 x-2\sqrt{3}\sin x=3\cos^2 x$

$4\sin x\sin\left(\frac{3\pi}{2}-x\right)=1 \Rightarrow -4\sin x\cos x=1 \Rightarrow \sin x\cos x=-\frac{1}{4}$ ـ۸

$\Rightarrow \frac{1}{2}\sin 2\alpha=-\frac{1}{4} \Longrightarrow \sin 2\alpha=-\frac{1}{2}$



$\Rightarrow 2\alpha=\frac{11\pi}{6} \Rightarrow \alpha=\frac{11\pi}{12}$

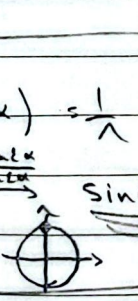
$2\alpha=\frac{7\pi}{6} \Rightarrow \alpha=\frac{7\pi}{12}$

$\frac{11\pi}{12}+\frac{7\pi}{12}=\frac{18\pi}{12}=\boxed{\frac{3\pi}{2}}$

$(1+\cos 2\alpha)(1+\cos 4\alpha)(1+\cos 8\alpha)=\frac{1}{8} \Rightarrow 2\cos 4\alpha\cdot 2\cos 8\alpha\cdot 2\cos 14\alpha=\frac{1}{8}$ ـ۹

$\Rightarrow \cos 4\alpha\cos 8\alpha\cos 14\alpha=\frac{1}{16} \xrightarrow{\times\frac{\sin 4\alpha}{\sin 4\alpha}} \sin 4\alpha\cos 4\alpha\cos 8\alpha\cos 14\alpha=\frac{1}{16}$

$\Rightarrow \frac{1}{16}\sin 32\alpha=\frac{1}{16} \Rightarrow \sin 32\alpha=1$



$\rightarrow 32\alpha=\frac{\pi}{2} \Rightarrow \boxed{\alpha=\frac{\pi}{64}}$

$\tan 2\alpha=\frac{1}{\tan\alpha} \Rightarrow \tan 3\alpha=\cot\alpha$ ـ۱۰