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

$$\frac{\cos\alpha}{\sin\alpha}=\frac{\cos\alpha}{\sqrt{\sin^2\alpha}}$$

$$|\sin\alpha|=\sin\alpha$$

$$\sin\alpha>0$$

$$\frac{\sin\alpha}{\cos\alpha}=\frac{\sin\alpha}{|\cos\alpha|}\Rightarrow|\cos\alpha|=\cos\alpha\Rightarrow\cos\alpha>0$$

ربع اول

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$$-\frac{\pi}{6}<2x<\frac{5\pi}{6}$$

$$-\frac{1}{2}<\frac{m-1}{4}\leq 1$$

$$-2<m-1\leq 4$$

$$-1<m\leq 5$$

۳-

$$\frac{2}{\sin 2x}=-3$$

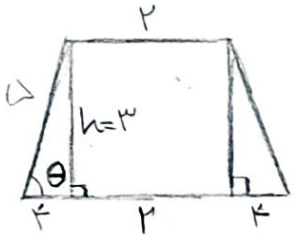
$$\frac{1}{\sin^3 2x+\cos^3 2x}=\frac{1}{(\sin 2x+\cos 2x)(\sin^2 2x-\sin 2x\cos 2x+\cos^2 2x)}$$

$$(\sin 2x+\cos 2x)^2=\sin^2 2x+\cos^2 2x+\sin 2x=1-\frac{2}{3}=\frac{1}{3}$$

$$\sin 2x+\cos 2x=\frac{-\sqrt{3}}{3}$$

$$=\frac{1}{\left(\frac{-\sqrt{3}}{3}\right)\left(1-\frac{1}{2}\sin 2x\right)}=\frac{1}{\left(\frac{-\sqrt{3}}{3}\right)\left(\frac{3}{4}\right)}=\frac{-9}{3\sqrt{3}}=\frac{-3\sqrt{3}}{4}$$

۴-



$$\sin\theta=\frac{h}{5}=\frac{3}{10}\Rightarrow h=3$$

$$S=\frac{(10+2)3}{2}=18$$

۵-

$$(-\cot 15)(\tan 15)-(\sin 15)(-\sin 15)=-1+\sin^2 15=-\cos^2 15$$

$$\Rightarrow k=-1$$

۶-

$$A=\sqrt{3}\left(-\frac{\sqrt{2}}{2}\right)(-\cos 27)-\sqrt{2}\left(\frac{\sqrt{2}}{2}\right)(-\cos 27)=\frac{\sqrt{3}}{2}\cos 27$$

$$\frac{\frac{\sqrt{3}}{2}\cancel{\cos 27}}{\cancel{\cos 27}}=\frac{\sqrt{3}}{2}$$

۷-

$$f\left(\frac{\pi}{12}\right)=16\cos^2\left(\frac{\pi}{12}\right)\cos^2\left(\frac{2\pi}{12}\right)\cos^2\left(\frac{3\pi}{12}\right)\cos^2\left(\frac{4\pi}{12}\right)$$

$$=4\left(\cos\left(\frac{\pi}{6}\right)+1\right)\left(\frac{1}{4}\right)\left(\frac{1}{4}\right)=\frac{2\sqrt{3}+6}{16}$$

$$\frac{\sqrt{3}}{2}\quad\frac{2\sqrt{3}+2}{4}$$

۸-

$$\sin x=\frac{2\tan\frac{x}{2}}{1+\tan^2\frac{x}{2}}\Rightarrow-\frac{3}{5}-\frac{3}{5}\tan^2\frac{x}{2}=2\tan\frac{x}{2}$$

$$\frac{3}{5}\tan^2\frac{x}{2}+2\tan\frac{x}{2}+\frac{3}{5}=0$$

$$\tan\frac{x}{2}=\begin{cases}\frac{-2+\sqrt{4-\frac{36}{25}}}{\frac{6}{5}}=-\frac{1}{3}\\ \frac{-2-\sqrt{4-\frac{36}{25}}}{\frac{6}{5}}=-3\end{cases}$$

$$1-\sin x=4+4\sin x$$

$$5\sin x=-3\quad\sin x=-\frac{3}{5}$$

$$\pi\leq x\leq\frac{3\pi}{2}\quad\frac{\pi}{2}\leq\frac{x}{2}\leq\frac{3\pi}{4}\Rightarrow\tan\frac{x}{2}=-\frac{1}{3}$$

۹-

$$\frac{\cancel{4}\sin\frac{\theta}{2}\cancel{\cos\frac{\theta}{2}}}{\cancel{4}\sin^2\frac{\theta}{2}}+\frac{\cancel{4}\cos^2\frac{\theta}{2}}{\cancel{4}\sin\frac{\theta}{2}\cancel{\cos\frac{\theta}{2}}}=2\cot\frac{\theta}{2}\Rightarrow k=2$$

$$\cos\left(\frac{۱۳\pi}{۴}+\alpha\right)=\cos\frac{۱۲\pi}{۴}\cos\alpha-\sin\frac{۹\pi}{۴}\sin\alpha=\left(\frac{-\sqrt{۲}}{۲}\right)\left(\frac{-۷\sqrt{۲}}{۱۰}\right)-\left(\frac{\sqrt{۲}}{۲}\right)\left(\frac{\sqrt{۲}}{۱۰}\right)$$

$$=\frac{۷}{۱۰}-\frac{۱}{۱۰}=۰/۶$$

$$\cos^{۲}\alpha+\sin^{۲}\alpha=۱$$

$$\cos^{۲}\alpha=\frac{۹۸}{۱۰۰}$$

$$\cos\alpha=\frac{۷\sqrt{۲}}{۱۰}$$

-۱۰