علی جمالی — یازدهم تجربی A

۱۶,۷۵

-۱ (۳)

$\sin,\cos>0 \Rightarrow$ ناحیه اول ✓

$\frac{\cos\alpha}{\sin\alpha}=\cot\alpha=\frac{\cos\alpha}{\sqrt{1-\cos^2\alpha}}=\frac{\cos\alpha}{|\sin\alpha|} \Rightarrow \sin\alpha\ge 0$

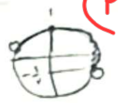
$\frac{1}{|\cos\alpha|}-\frac{\sin\alpha}{\cos\alpha}=\frac{1-\sin\alpha}{|\cos\alpha|}$

$E=\frac{\cos\alpha}{|\cos\alpha|} \rightarrow E-\sin\alpha=E-E\sin\alpha \Rightarrow E=1 \Rightarrow \cos\alpha\ge 0$

-۲ (۲)

$-\frac{\pi}{12}<x<\frac{5\pi}{12}$

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



$-\frac{1}{2}<\sin 2x\le 1$

$\Rightarrow -\frac{1}{2}<\frac{m-1}{4}\le 1 \Rightarrow$

$-1<m\le 5$ $\boxed{m\in(-1,5]}$ ✓

-۳ (۳)

$\tan+\cot=\frac{\sin^2+\cos^2}{\sin\cos}=\frac{1}{\sin\cos}=-3$

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

$\sin+\cos=\pm\frac{1}{\sqrt3}$

$3\pi<4x<4\pi$

$\frac{3\pi}{4}<x<\pi$

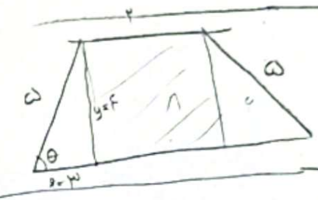
$\Downarrow$

$\sin+\cos<0$

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

$\frac{1}{(-\frac{1}{\sqrt3})(\frac{4}{3})}=\boxed{\frac{-3\sqrt3}{4}}$ ✓

-۴ (۲)



$x=5\times\cos\theta=3$ $(\frac{3}{5})$

$y=5\times\sin\theta=4$

$S=2\times4+\frac{3\times4}{2}\times2=\boxed{20}$ ✓

-۵ (۲)

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

$\Rightarrow \boxed{K=-1}$ ✓

-۶ $\boxed{\frac{5}{2}}$ (۲)

$\sqrt3\cdot\frac{-\sqrt3}{2}\cdot(-\cos 27)-\sqrt2\cdot\frac{\sqrt2}{2}\cdot(-\cos 27)=(\frac{3}{2}+1)(\cos 27)$ ✓

-۷ (۱)

$f(x)=\frac{\cos^2(4\pi x)}{\sin^2(3x)}$ $=\frac{1}{14}$

$f(\frac{\pi}{36})=\frac{\cos^2(\frac{4\pi}{3})}{\sin^2(\frac{\pi}{12})}=\frac{\cancel{\frac{1}{4}}\ \frac{3}{4}}{\frac{2-\sqrt3}{4}}=\frac{1}{2-\sqrt3}=\cancel{\boxed{2+\sqrt3}}$ $\quad -\frac{\sqrt3}{2}$

$\sin^2\frac{\pi}{12}=\frac{1-\cos\frac{\pi}{6}}{2}=\frac{1-\frac{\sqrt3}{2}}{2}=\frac{2-\sqrt3}{4}$

-۸ (۲)

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

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

$\cos x<0 \Rightarrow \cos x=-\frac{4}{5}$

$\frac{9}{25}+\cos^2 x=1$

$\tan\frac{x}{2}=\frac{\sin x}{1+\cos x}=\frac{-\frac{3}{5}}{\frac{1}{5}}=\boxed{-3}$ ✓

$\frac{\sin x}{1+\cos x}=\frac{2\sin\frac{x}{2}\cos\frac{x}{2}}{2\cos^2\frac{x}{2}}=\tan\frac{x}{2}$

-۹ ۰

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

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

$2\cot\frac{x}{2}+2\cot\frac{x}{2}=4\cot\frac{x}{2}\Rightarrow \cancel{K=4}$

-۱۰ ۱/۷۵

$\cos(\frac{11\pi}{4}+\alpha)=\cos(\frac{3\pi}{4}+\alpha)=\cos\frac{3\pi}{4}\cos\alpha-\sin\frac{3\pi}{4}\sin\alpha=\frac{\sqrt2}{2}(-\cos\alpha-\sin\alpha)$ ✓

$\sin\alpha=\frac{\sqrt2}{10}$ $\quad \frac{2}{100}+\cos^2\alpha=1 \Rightarrow \cos\alpha=\pm\frac{7\sqrt2}{10}$

$\Rightarrow \cos\alpha<0$ ✓

$\frac{\sqrt2}{2}(-\cos\alpha-\sin\alpha)=\frac{\sqrt2}{2}(\frac{7\sqrt2}{10}-\frac{\sqrt2}{10})=$

$\frac{\sqrt2}{2}(\frac{6\sqrt2}{10})=\cancel{\boxed{\ }}$ $\boxed{\frac{3}{5}}$

دقت!

-۹

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

$\frac{2\sin\theta}{1-\cos\theta}=\frac{2\times2\sin\frac{\theta}{2}\cos\frac{\theta}{2}}{2\sin^2\frac{\theta}{2}}=2\cot\frac{\theta}{2}\rightarrow\boxed{K=2}$

-۷

$$f\left(\frac{\pi}{۲۴}\right) = ۱۶\cos^۲\left(\frac{\pi}{۱۲}\right)\cos^۲\left(\frac{\pi}{۶}\right)\cos^۲\left(\frac{\pi}{۳}\right)\cos^۲\left(\frac{۲\pi}{۳}\right)$$

$$\cos^۲\frac{\pi}{۱۲} = \frac{۱+\cancel{\cos\frac{\pi}{۶}}^{\frac{\sqrt{۳}}{۲}}}{۲} \longrightarrow \cos^۲\frac{\pi}{۱۲} = \frac{۲+\sqrt{۳}}{۴}$$

$$f\left(\frac{\pi}{۲۴}\right) = ۱۶\left(\frac{۲+\sqrt{۳}}{۴}\right) \times \frac{۳}{۴} \times \frac{۱}{۴} \times \frac{۱}{۴} = \boxed{\frac{۳(۲+\sqrt{۳})}{۱۶}}$$