بنیامین نوروزی _ تکلیف ۲۸ _ یازدهم پسر B　　۱۹٫۵

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۱) ۲

$1-\cos^2\alpha=\sin^2\alpha$

$\frac{\cos\alpha}{\sin\alpha}=\frac{\cos\alpha}{|\sin\alpha|} \to \sin>0 \to$ ناحیه ۱ یا ۲ / $\frac{1-\sin\alpha}{|\cos\alpha|}=\frac{1}{|\cos\alpha|}-\frac{\sin\alpha}{|\cos\alpha|}=\frac{1}{|\cos\alpha|}-\frac{\sin\alpha}{\cos\alpha} \Rightarrow \cos>0$ ناحیه ۱ یا ۴

$\Rightarrow \alpha \to$ ناحیه اول

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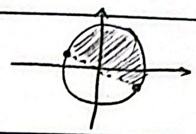
۲) ۲

$-\frac{\pi}{6}<2x<\frac{5\pi}{6} \to -\frac{1}{2}<\sin 2x\leq 1 \to -2<m-1\leq 4 \to \boxed{-1<m\leq 5}$



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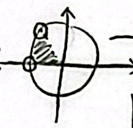
۳) ۲

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

$\frac{3\pi}{4}<x<\pi \to$  $\to \sin x>0,\ \cos x<0,\ |\cos x|>|\sin x|$

$\sin^3x+\cos^3x=(\underbrace{\sin x+\cos x}_{\ominus})(\cancel{\sin^2x+\cos^2x}-\cancel{\sin x\cos x})$

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

$\Rightarrow = -\frac{\sqrt3}{3}(\frac{4}{3}) = \frac{-9}{4\sqrt3} = \frac{-3\sqrt3}{4}$

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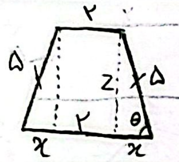
۴) ۲



$\cos\theta=\frac{6}{10}=\frac{x}{5} \to \boxed{x=3} \Rightarrow$ قاعده بزرگ $=8 \Rightarrow S=\frac{(2+8)\times \cancel{4}^{2}}{\cancel{2}}=20$

$z=\sqrt{25-9}=4$

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۵) ۲

$\tan(\frac{3\pi}{2}+15)\times\tan(-\pi+15)-\sin(6\pi+15)\times\cos(\frac{3\pi}{2}-15)=(-\cot 15^\circ)(+\tan 15^\circ)-(\sin 15^\circ)(-\sin 15^\circ)$

$\sin^2 15^\circ-1=\boxed{-\cos^2 15^\circ=K\cos^2 15} \to \boxed{K=-1} \Leftarrow (-1)-(-\sin^2 15)$

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۶) ۲

$\sqrt3\cos(\pi+30^\circ)\sin(\frac{3\pi}{2}-27^\circ)-\sqrt2\sin(\pi-45^\circ)\cos(\pi-27^\circ)=\sqrt3(\underbrace{-\cos 30^\circ}_{-\frac{\sqrt3}{2}})(-\cos 27^\circ)-\sqrt2(\underbrace{+\sin 45^\circ}_{\frac{\sqrt2}{2}})(-\cos 27^\circ)$

$=(-\cos 27^\circ)(\underbrace{-\frac{3}{2}-\frac{2}{2}}_{-\frac{5}{2}})=\frac{\frac{5}{2}\cos 27^\circ}{\cos 27^\circ}=\frac{5}{2}$

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۷) ۱٫۵

$16\cos^2(\frac{\pi}{12})\underbrace{\cos^2(\frac{\pi}{6})}_{\frac{3}{4}}\times\underbrace{\cos^2(\frac{\pi}{3})}_{\frac{1}{4}}\times\underbrace{\cos^2(\frac{2\pi}{3})}_{-\frac{1}{4}}=-\frac{3}{4}\cos^2 15^\circ=-\frac{3}{4}\left(\frac{1+\cos 30^\circ}{\sin 30^\circ}\right)=-\frac{3}{4}\left(\frac{\frac{2+\sqrt3}{2}}{\frac{1}{2}}\right)=\frac{-6-3\sqrt3}{4}$

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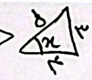
۸) ۲

$\cos x<0 / \sin x<0$ / $1-\sin x=4+4\sin x \to \sin x=-\frac{3}{5} \Rightarrow$ 　$\sin 2\alpha=\frac{2\tan\alpha}{1+\tan^2\alpha}$　$\tan(\frac{x}{2})=t$

$\Rightarrow -\frac{3}{5}=\frac{2t}{1+t^2} \to -3t^2-3=10t \to 3t^2+10t+3=0 \to \frac{-10\pm\sqrt{100-36}}{6}$ → $t=-3$ صحیح ، $t=-\frac{1}{3}$ غلط

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۹) ۲

$\frac{1-\cos\alpha}{\sin\alpha}=\frac{\sin\alpha}{1+\cos\alpha}=\tan(\frac{\alpha}{2}) \to \cot(\frac{\alpha}{2})+\cot(\frac{\alpha}{2})=2\cot(\frac{\alpha}{2})=K\cot(\frac{\alpha}{2}) \to \boxed{K=2}$

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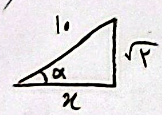
۱۰) ۲

ناحیه ۲ $\to \sin\alpha>0,\ \cos\alpha<0$ / $\cos(\underbrace{\cancel{2\pi}}_{\text{بی اثر}}+\frac{3\pi}{4}+\alpha)=\cos\frac{3\pi}{4}\cos\alpha-\sin\frac{3\pi}{4}\sin\alpha=(-\frac{\sqrt2}{2})(-\frac{7\sqrt2}{10})-(\frac{\sqrt2}{2})(\frac{\sqrt2}{10})$

$\sin\alpha=\frac{\sqrt2}{10} \to$  $\to x=\sqrt{100-2}=\sqrt{98}=7\sqrt2$　　$=\frac{14}{20}-\frac{2}{20}=\frac{12}{20}=0{,}6$

$\Rightarrow \cos\alpha=-\frac{7\sqrt2}{10}$

۷-

$$f\left(\frac{\pi}{24}\right) = 16\cos^2\left(\frac{\pi}{12}\right)\cos^2\left(\frac{\pi}{6}\right)\cos^2\left(\frac{\pi}{3}\right)\cos^2\left(\frac{2\pi}{3}\right)$$

$$\cos^2\frac{\pi}{12} = \frac{1+\cancel{\cos\frac{\pi}{6}}^{\frac{\sqrt{3}}{2}}}{2} \longrightarrow \cos^2\frac{\pi}{12} = \frac{2+\sqrt{3}}{4}$$

$$f\left(\frac{\pi}{24}\right) = 16\left(\frac{2+\sqrt{3}}{4}\right)\times\frac{3}{4}\times\frac{1}{4}\times\frac{1}{4} = \boxed{\frac{3(2+\sqrt{3})}{16}}$$