کارن جاویدی نژاد — یازدهم پیرو B

۲۵ آفرین!

۱) ۲

$\cot a = \frac{\cos a}{\sqrt{1-\cos^2 a}} \xrightarrow{\sin^2 a = 1-\cos^2 a} \cot a = \frac{\cos a}{|\sin a|}$ باید علامت مثبت بیرون بیاید $\sin a > 0$

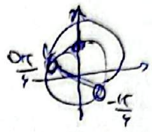
$\frac{1}{\sqrt{\cos^2 a}} - \frac{1}{\cot a} \Rightarrow \frac{\cancel{1}}{|\cos a|} + \frac{\sin a}{\cos a} = \frac{1-\sin a}{|\cos a|} \rightarrow \frac{\sin a}{\cos a} = \frac{\sin a}{|\cos a|}$

$\cos a > 0$

$\sin a > 0 \,,\, \cos a > 0 \Rightarrow a$ ناحیه اول

۲) ۲

$-\frac{\pi}{12} < x < \frac{5\pi}{12} \xrightarrow{\times 2} -\frac{\pi}{6} < 2x < \frac{5\pi}{6} \xrightarrow{\sin \text{ جاگذاری}} \sin -\frac{\pi}{6} < \sin 2x < \sin \frac{5\pi}{6}$



$\max = 1 \quad \min = -\frac{1}{2}$

$\xrightarrow{\sin 2x = \frac{m-1}{4}} -\frac{1}{2} < \frac{m-1}{4} \le 1 \rightsquigarrow -1 < m \le 5$

۳) ۲

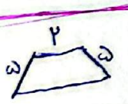
$\tan x + \cot x = \frac{\sin}{\cos} + \frac{\cos}{\sin} = \frac{1}{\sin \cos} = -3 \rightarrow \sin\cos = -\frac{1}{3} \qquad (\sin + \cos)^2 = 1 + 2\sin\cos$

$(\sin + \cos)^2 = \frac{1}{3} \xrightarrow{\text{جذر}} |\sin + \cos| = \sqrt{\frac{1}{3}} = \frac{\sqrt{3}}{3} \Rightarrow \sin x + \cos x = -\frac{\sqrt{3}}{3}$

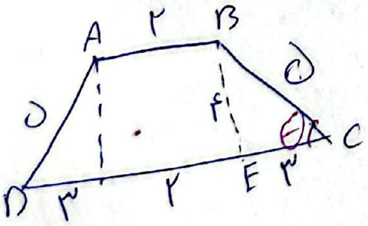
باید منفی باشد طبق $3\pi < 2x < 4\pi$

$\frac{1}{\sin^3 x + \cos^3 x} \xrightarrow{\text{فیل و فنجون}} \frac{1}{\sin + \cos} \times \frac{1}{(\underbrace{\sin^2 + \cos^2}_{1} - \underbrace{\sin\cos}_{-\frac{1}{3}})} = \frac{1}{(\frac{-\sqrt{3}}{3})(\frac{4}{3})} = \boxed{-\frac{9}{4\sqrt{3}}}$

۴) ۲



$\cos\theta = 0.6 \rightarrow CE = 3$ فیثاغورس $\rightarrow BE = 4$



$S = \frac{(DC + AB)(BE)}{2} = \frac{10 \times 4}{2} = 20$

۵) ۲

$\tan(\frac{3\pi}{2}+15) \times \tan(15-\pi) - \sin(6\pi+15) \times \cos(\frac{3\pi}{2}-15) \rightarrow (-\cot 15)(\tan 15) - (-\sin 15) \times (-\sin 15) = -1 - (-\sin^2 15) = -\cos^2 15$

$\frac{-\cos^2 15}{K\cos^2 15} \Rightarrow \boxed{K = -1}$

۶) ۲

$\sqrt{3}\left(-\frac{\sqrt{3}}{2}\right)\left(\sin\left(\frac{3\pi}{2}-27\right)\right)-\sqrt{2}\left(\frac{\sqrt{2}}{2}\right)\cos(\pi-27)=-\frac{3}{2}\left(-\cos 27^\circ\right)-\left(-\cos 27\right)$

$=2{,}5\cos 27^\circ \rightsquigarrow$ ۲٫۵ برابر

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۷) ۲

$f\left(\frac{\pi}{36}\right)=16\cos^2(15)\cos^2(30)\cos^2(60)\cos^2(120)$ $\quad \cos 15=\cos(45-30)=$

$=\cos 45\cos 30+\sin 45\sin 30=\boxed{\frac{\sqrt{6}+\sqrt{2}}{4}}$

$\xrightarrow{\text{جایگذاری}} 16\left(\frac{\sqrt{6}+\sqrt{2}}{4}\right)^2\left(\frac{\sqrt{3}}{2}\right)^2\left(\frac{1}{2}\right)^2\left(-\frac{1}{2}\right)^2=\boxed{\frac{6+3\sqrt{3}}{16}}$

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۸) ۲

$\frac{1-\sin x}{1+\sin x}=4 \longrightarrow 4+4\sin x=1-\sin x \longrightarrow \boxed{\sin x=-\frac{3}{5}}\ ,\ \boxed{\cos x=-\frac{4}{5}}$

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

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۹) ۲

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

$\frac{1-\cos\alpha}{\sin\alpha}=\frac{2\sin^2\frac{\alpha}{2}}{2\sin\frac{\alpha}{2}\cos\frac{\alpha}{2}}=\tan\frac{\alpha}{2}$ $\longrightarrow \frac{\sin\alpha}{1-\cos\alpha}+\frac{1+\cos\alpha}{\sin\alpha}=\frac{2\cot\frac{\alpha}{2}}{K\cos\frac{\alpha}{2}} \longrightarrow \boxed{K=2}$

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۱۰) ۲

$\cos^2\alpha=1-\sin^2\alpha \longrightarrow \cos^2\alpha=1-\frac{2}{100} \longrightarrow \cos\alpha=(-)\frac{\sqrt{98}}{10}$

ربع دوم

$\longrightarrow \cos\left(\frac{11\pi}{4}+\alpha\right)=\left(\cos\frac{11\pi}{4}\right)(\cos\alpha)-\left(\sin\frac{11\pi}{4}\right)(\sin\alpha)=\left(-\frac{\sqrt{2}}{2}\right)\left(-\frac{\sqrt{98}}{10}\right)-\left(\frac{\sqrt{2}}{2}\right)\left(\frac{\sqrt{2}}{10}\right)$

$=\frac{14}{20}-\frac{2}{20}=\frac{12}{20}$