تکلیف شماره ۲۸

Date.

یازدهم رشته A — سانیا سلیمی

(۱۹)

۱- ناحیه دوم

$\cot\alpha = \frac{\cos\alpha}{\sqrt{1-\cos^2\alpha}} , \frac{1}{\sqrt{\cos^2\alpha}} - \frac{1}{\cot\alpha} = \frac{1-\sin\alpha}{|\cos\alpha|}$ ⇐ ناحیه ۱ یا ۲

(۲)

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

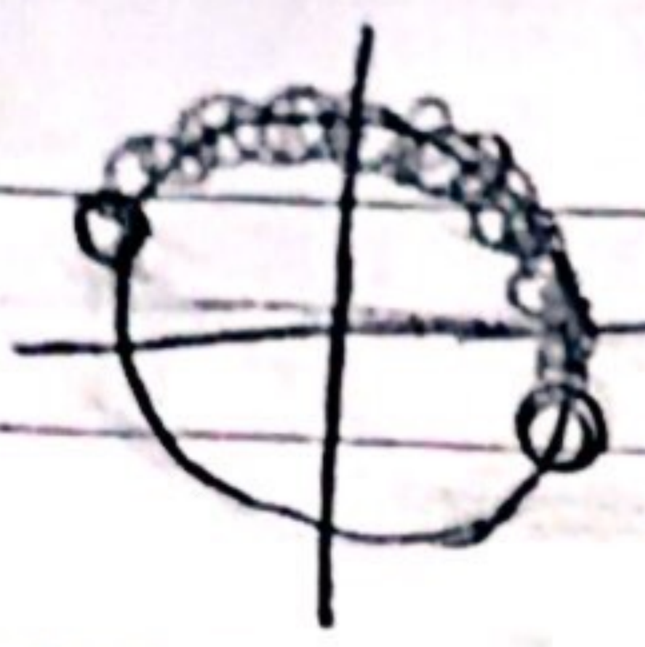
$\frac{1}{|\cos\alpha|} - \frac{\sin\alpha}{\cos\alpha} = \frac{1-\sin\alpha}{\cos\alpha}$ ⇐ مخرج ها هم باید یکسان باشند ⇐ $|\cos\alpha| = \cos\alpha$

$\cos\alpha > 0 \Leftrightarrow$ ناحیه ۱ و ۴

۲-

$m = ?$ $\sin 2x = \frac{m-1}{4} , \frac{-\pi}{12} < x < \frac{5\pi}{12}$

$m \in (-1, 5]$



$\Leftrightarrow \frac{-\pi}{6} < 2x < \frac{5\pi}{6}$ (۲)

$\frac{-1}{2} < \frac{m-1}{4} \leq 1 \Rightarrow -2 < m-1 \leq 4 \Leftarrow -\frac{1}{2} < \sin 2x \leq 1$

$\Leftrightarrow -1 < m \leq 5$

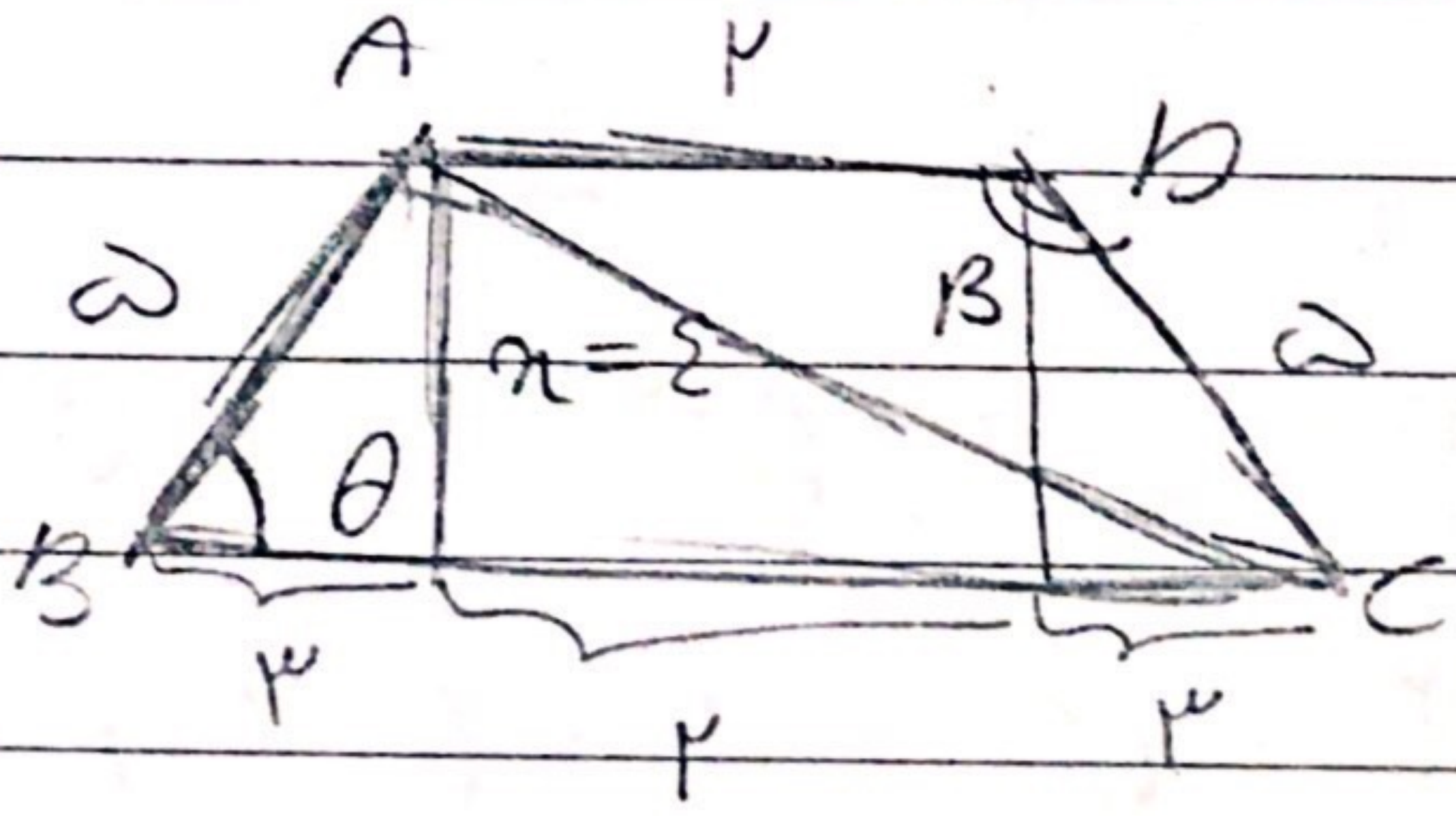
۳- $\begin{cases} 3\pi < 4x < 4\pi \\ \tan x + \cot x = -3 \end{cases}$

$\frac{1}{\sin^3 x + \cos^3 x}$ $\begin{cases} \overset{*}{=} \frac{\sin^2x+\cos^2x - \sin x\cos x}{1} = \frac{4}{3} \quad (1, \; -\frac{1}{3}) \\ (\sin x + \cos x)^2 = \sin^2 x + \cos^2 x + 2\sin x\cos x = \frac{1}{3} \Rightarrow |\sin x + \cos x| = \frac{\sqrt{3}}{3} \end{cases}$

$\Leftrightarrow \frac{1}{(\sin x+\cos x)(\sin^2x+\cos^2x-\sin x\cos x)} \overset{*}{=} \frac{1}{\frac{4}{3}\times -\frac{\sqrt{3}}{3}} = \frac{-9}{4\sqrt{3}}$ $\quad -\frac{\sqrt{3}}{3} = \sin x + \cos x$ (۲)

می‌دانیم ← $\tan x + \cot x = \frac{2}{\sin 2x} \Rightarrow -6\sin x\cos x = 2 \Rightarrow \sin x\cos x = -\frac{1}{3}$ $\quad \frac{3\pi}{4} < x < \pi \Rightarrow |\cos x| > |\sin x|$

۴-



$\cos\theta = 0.6$

$\Leftrightarrow \sin\theta = 0.8$

$x = \sin\theta \times 5 = \frac{8}{10} \times 5 = 4$ (۲)

می‌دانیم $\beta + \theta = 180° \Rightarrow \sin\theta = \sin\beta$

$S_{\triangle ABC} = 8 \times 5 \times \frac{8}{10} \times \frac{1}{2} = 16$

$\Rightarrow S_{کل} = \boxed{20}$

$S_{\triangle ADC} = 2 \times 5 \times \frac{8}{10} \times \frac{1}{2} = 4$

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$\tan(210°)\tan(-150°) - \sin(1090°)\cos(200°) = k\cos^2 10° - 0$

$\tan(\frac{3}{2}\pi + 10°) \times -\tan(\pi - 10°) - \sin(2\pi + 10)\cos(\frac{3\pi}{2} - 10)$

$-\underbrace{\cot 10° \times \tan 10}_{-1} - \underbrace{\sin 10 \times -\sin 10}_{+\sin^2 10} = \sin^2 10° - 1$

$-(1 - \sin^2 10°) = -\cos^2 10° \Rightarrow (k = -1)$

$A = \sqrt{3}\cos(210°)\sin(240°) - \sqrt{2}\sin(135°)\cos(150°) = -6$

$\sqrt{3}\left(\underbrace{\cos(\frac{3\pi}{2} - \frac{\pi}{3})}_{-\sin\frac{\pi}{3}}\sin(\pi + 60)\right) - \sqrt{2}\left(\underbrace{(\sin\frac{3\pi}{4})}_{\frac{\sqrt{2}}{2}}\underbrace{(\cos(\pi - 45))}_{-\cos 45°}\right) = 0$

$\cos(45°)$

$\sqrt{3}\left(\frac{-\sqrt{3}}{2} \times -\cos 45°\right) = \frac{+3}{2}\cos 45°$

$\sin(\pi + 60) = -\sin 60° = -\cos 45°$

$\Rightarrow A = -\frac{3}{2}\cos 45° + \cos 45° \Rightarrow \frac{-\frac{1}{2}\cancel{\cos 45°}}{\cancel{\cos 45°}} = (-\frac{1}{2})$

$f(x) = 14\cos^2(3x)\cos^2(6x)\cos^2(12x)\cos^2(24x)$ -7

$f(\frac{\pi}{24}) = ?$

$\Rightarrow 14\cos^2(\frac{\pi}{12})\cos^2(\frac{\pi}{6})\cos^2(\frac{\pi}{3})\cos^2(\frac{2\pi}{3})$

$= \cancel{14} \times (\frac{2+\sqrt{3}}{\cancel{4}}) \times (\frac{3}{\cancel{4}}) \times (\frac{1}{4}) \times (\frac{1}{4}) =$

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

$\frac{7 + 4\sqrt{3}}{16}$

$\frac{14(2+\sqrt{3})}{64} = \frac{7 + 4\sqrt{3}}{16}$

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۸)

$$\frac{1-\sin x}{1+\sin x}=4$$

x در ربع سوم

$$\tan\frac{x}{2}$$

$$\frac{1-\sin x}{1+\sin x}\times\frac{1+\sin x}{1+\sin x}=\frac{1-\sin^2 x}{(1+\sin x)^2}=\frac{\cos^2 x}{\left(\frac{4}{25}\right)}=\frac{25\cos^2 x}{4}=4 \Rightarrow \cos x=-\frac{4}{5}$$

۶

$$1-\sin x=4+4\sin x \Rightarrow 5\sin x=-3 \Rightarrow \sin x=-\frac{3}{5}$$

$$\sin^2\frac{x}{2}=\frac{1-\cos x}{2}=\frac{\frac{5}{5}+\frac{4}{5}}{2}=\frac{9}{10} \Rightarrow \tan^2\frac{x}{2}=9$$

$$\cos^2\frac{x}{2}=\frac{1+\cos x}{2}=\frac{\frac{5}{5}-\frac{4}{5}}{2}=\frac{1}{10} \qquad \tan\frac{x}{2}=\pm 3$$

$$\tan\frac{x}{2}=\boxed{-3}$$

وقتی x در ربع سوم باشد $\frac{x}{2}$ در ربع دوم $\Leftarrow$

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۹)

$$\frac{\sin\theta}{1-\cos\theta}+\frac{1+\cos\theta}{\sin\theta}=k\cot\frac{\theta}{2} \qquad k=?$$

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

$$L \Rightarrow \frac{2\sin\frac{\theta}{2}\cos\frac{\theta}{2}}{2\sin^2\frac{\theta}{2}}+\frac{2\cos^2\frac{\theta}{2}}{2\sin\frac{\theta}{2}\cos\frac{\theta}{2}}=2\cot\frac{\theta}{2}$$

$$\frac{\cos\frac{\theta}{2}}{\sin\frac{\theta}{2}} \to \cot\frac{\theta}{2} \qquad \cot\frac{\theta}{2}$$

$$\Rightarrow \boxed{k=2}$$

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۱۰) α در ربع دوم

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

$$\cos\left(3\pi-\left(\frac{\pi}{4}-\alpha\right)\right)=-\cos\left(\frac{\pi}{4}-\alpha\right)=-\left(\cos\frac{\pi}{4}\cos\alpha+\sin\frac{\pi}{4}\sin\alpha\right)$$

$$\frac{\sqrt{2}}{2}\times\frac{\sqrt{2}}{10}+\frac{\sqrt{2}}{2}\times\frac{-7\sqrt{2}}{10}$$

$$=-\left(\frac{2}{20}-\frac{14}{20}\right)=\frac{12}{20}=\boxed{\frac{3}{5}}$$

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

$$\frac{100}{100}-\frac{2}{100}=\frac{98}{100}=\cos^2\alpha$$

$$\cos\alpha=-\frac{\sqrt{98}}{10}=-\frac{7\sqrt{2}}{10}$$

PAPCO

1) $\cot\alpha = \frac{\cos\alpha}{\sin\alpha} = \frac{\cos\alpha}{|\sin\alpha|} \rightarrow |\sin\alpha| = \sin\alpha \rightarrow \sin\alpha > 0$

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

} ناحیه اول