یلدا مهرپرور   تکلیف ریاضی دهم ۱۸   دنیا سادات نصیری

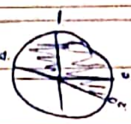
۱) $\frac{1}{\sqrt{\cos^2\alpha}} - \frac{1}{\cot\alpha} = \frac{1-\sin\alpha}{|\cos\alpha|} \cdot \frac{1}{|\cos\alpha|} - \frac{\sin\alpha}{\cos\alpha} = \frac{1-\sin\alpha}{|\cos\alpha|} - \frac{\sin\alpha}{\cos\alpha} = \frac{\cancel{1}+\sin\alpha}{|\cos\alpha|}$

$\cos\alpha \geq 0$

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

ناحیه اول

۲) $-\frac{\pi}{12} < x < \frac{5\pi}{12} \to -\frac{\pi}{6} < 2x < \frac{5\pi}{6}$



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

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

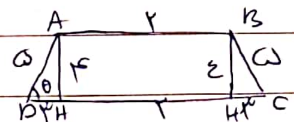
$3\pi < 4x < 4\pi \to \frac{3\pi}{4} < x < \pi$ علامت sin؟ cos x — cos منفی

$(\sin x + \cos x)^2 = \cancel{\sin^2 x + \cos^2 x} + \cancel{2\cos x \sin x} = \frac{1}{3} \to \sin x + \cos x = -\frac{\sqrt{3}}{3} \to \sin x = \frac{\sqrt{15} - \sqrt{3}}{6}$

$(\sin x - \cos x)^2 = \cancel{\sin^2 x + \cos^2 x} - \cancel{2\sin x \cos x} = \frac{5}{3} \to \sin x - \cos x = \frac{\sqrt{15}}{3}$ $\cos x = \frac{-\sqrt{15} - \sqrt{3}}{6}$

$\frac{1}{\sin^3 x + \cos^3 x} = \frac{1}{(\sin x + \cos x)^3 - 3\cos x \sin x(\sin x + \cos x)} = \frac{1}{\left(\frac{-\sqrt{3}}{3}\right)^3 - \cancel{3}\times\left(-\frac{1}{\cancel{3}}\right)\times\left(-\frac{\sqrt{3}}{3}\right)} = \frac{1}{\frac{-3\sqrt{3}}{27} - \frac{\sqrt{3}}{3}}$

$\frac{1}{\frac{-3\sqrt{3} - 9\sqrt{3}}{27}} = \frac{\cancel{27}\ 9 \times \sqrt{3}}{\cancel{12}\sqrt{3} \times \sqrt{3}} = -\frac{3\sqrt{3}}{4}$

۴) 

$\cos\theta = \frac{6}{10} \to \frac{6}{10} = \frac{DH}{AD} \to DH = 3 \to A\hat{D}H \cong B\hat{H'}C$

$BH' = 3$

$A\hat{D}H$: $AH^2 + DH^2 = AD^2$ (9, 25) $\to AH = 4$, $H'C = 4$ $ABH'H$ مستطیل $\to AB = HH' = 2$

$DC = 3 + 2 + 3 = 8$

مساحت $= \cancel{4} \times \frac{(2+8)}{\cancel{2}} = 20$

۵) $\tan 285 \tan(-165) - \sin(1095)\cos(255) = \tan\left(\frac{3\pi}{2} + 15\right)\tan(-\pi + 15) - \sin(6\pi + 15)\cos\left(\frac{3\pi}{2} - 15\right)$

$= (-\cot 15) \times \tan 15 - \sin 15 \times (\sin 15) = \sin^2 15 - 1 = -\cos^2 15 \to k = -1$

۶) $\sqrt{3}\cos 210 \sin 243 - \sqrt{2}\sin 135 \cos 153 = \sqrt{3} \times \left(\frac{-\sqrt{3}}{2}\right) \times \sin\left(\frac{3\pi}{2} - 27\right) - \sqrt{2} \times \frac{\sqrt{2}}{2} \times \cos(\pi - 27)$

$= \frac{3}{2} \times (\cos 27) - (-\cos 27) = \frac{\cos 27 + \cos 27}{2} = \frac{3\cos 27}{2} \to$ برابر $\frac{3}{2}$

$16\cos^2(3x)\cos^2(6x)\cos^2(12x)\cos^2(24x) = \frac{16\sin^2(3x)\cos^2(3x)\cos^2(6x)\cos^2(12x)\cos^2(24x)}{\sin^2(3x)}$ (7

$= \frac{\cancel{16}\,4\sin^2(6x)\cos^2(6x)\cos^2(12x)\cos^2(24x)}{\sin^2(3x)} = \frac{4\sin^2(12x)\cos^2(12x)\cos^2(24x)}{\sin^2(3x)} = \frac{4\sin^2(24x)\cos^2(24x)}{\sin^2(3x)}$

$= \frac{\sin^2(48x)}{\sin^2(3x)} = \frac{\sin^2(\cancel{48}\times\frac{\pi}{\cancel{36}})}{\sin^2(3\times\frac{\pi}{\cancel{36}_{12}})} = \frac{\sin^2(\frac{4\pi}{3})}{\frac{1-\cos\frac{\pi}{6}}{2}} = \frac{\frac{3}{4}}{\frac{1-\frac{\sqrt{3}}{2}}{2}} = \frac{\frac{3}{\cancel{4}}}{\frac{2-\sqrt{3}}{\cancel{4}}} = \frac{3}{2-\sqrt{3}}$

$\frac{1-\sin x}{1+\sin x} = 4 \rightarrow 1-\sin x = 4+4\sin x \Rightarrow 5\sin x = -3 \rightarrow \sin x = \frac{-3}{5}$ (8

$\tan^2(\frac{x}{2}) = \frac{1-\cos x}{1+\cos x} = \frac{1+\frac{4}{5}}{1-\frac{4}{5}} = \frac{\frac{9}{5}}{\frac{1}{5}} = 9 \rightarrow \tan(\frac{x}{2}) = 3$ $\quad \rightarrow \cos x = \frac{-4}{5}$

$\frac{\sin\theta}{1-\cos\theta} + \frac{1+\cos\theta}{\sin\theta} = \frac{1}{\tan(\frac{\theta}{2})} + \frac{1}{\tan(\frac{\theta}{2})} = 2\cot(\frac{\theta}{2})$ → گزینه ۲ (9

$\sin\alpha = \frac{\sqrt{2}}{10} \rightarrow \underbrace{\sin^2\alpha}_{\frac{2}{100}} + \cos^2\alpha = 1 \rightarrow \cos^2\alpha = \frac{98}{100} \Rightarrow \cos\alpha = \frac{-\sqrt{98}}{10}$ (10

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

$= (\frac{-\sqrt{98}}{10})(\frac{-\sqrt{2}}{2}) - (\frac{\sqrt{2}}{10})\times(\frac{\sqrt{2}}{2}) = \frac{\overset{14}{\sqrt{98}\times\sqrt{2}}}{20} - \frac{2}{20} = \frac{12}{20} = \frac{6}{10} = \frac{3}{5}$