* سمانه موسوی   * تکلیف شماره ۲۸   یازدهم ریاضی B

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

$\to \frac{\sin\alpha}{|\cos\alpha|} = \tan\alpha \to \cos\alpha > 0$ $\begin{cases} \sin\alpha > 0 \\ \cos\alpha > 0 \end{cases} \Rightarrow$ **α در ناحیه اول**

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

② $\sin 2x = \frac{m-1}{4}$ $-\frac{\pi}{12} < x < \frac{5\pi}{12} \xrightarrow{\times 2} -\frac{\pi}{6} < 2x < \frac{5\pi}{6}$

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

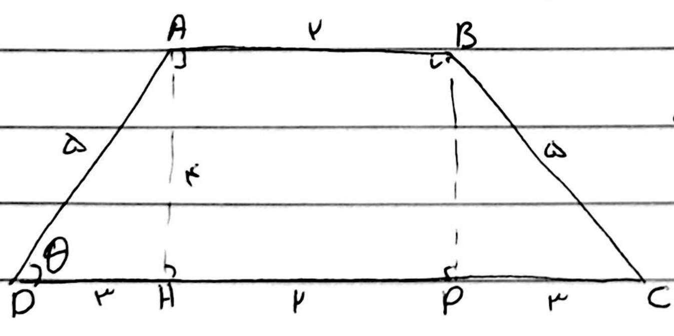
③ $\tan\alpha + \cot\alpha = -3 \to \frac{1}{\sin\alpha\cos\alpha} = -3 \to \sin\alpha\cos\alpha = \frac{-1}{3}$

$(\sin\alpha + \cos\alpha)^2 = \sin^2\alpha + \cos^2\alpha + 2\sin\alpha\cos\alpha = 1 + \frac{-2}{3} = \frac{1}{3} \to \sin\alpha + \cos\alpha = \begin{cases} \frac{1}{\sqrt{3}} \text{ غ ق ق } ✗ \\ \frac{-1}{\sqrt{3}} ✓ \end{cases}$

$3\pi < 4\alpha < 4\pi \to \frac{3\pi}{4} < \alpha < \pi \xrightarrow{\text{ناحیه دوم}} |\sin\alpha| < |\cos\alpha|$

$\frac{1}{\sin^3\alpha + \cos^3\alpha} = \left(\frac{1}{(\sin\alpha+\cos\alpha)(\underbrace{\sin^2\alpha+\cos^2\alpha}_{1} - \underbrace{\sin\alpha\cos\alpha}_{-\frac{1}{3}})}\right) = \frac{1}{\frac{-1}{\sqrt{3}} \times \frac{4}{3}} =$ **$\frac{-3\sqrt{3}}{4}$**

④



$\cos\theta = \frac{3}{5} = 0/6 \to \frac{DH}{AD} = \frac{6}{10} \to DH = 3 = PC$

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

$S = \frac{(2+8) \times 4}{2} =$ **۲۰**

⑤ $\tan(285)\tan(-165) - \sin(1095)\cos(255) = \tan(270+15)\tan(-180+15) - \sin(1080+15) \to$

$\to \cos(270-15) = (-\cot 15)(\tan 15) - (\sin 15)(-\sin 15) = -1 + \sin^2 15 = -(1-\sin^2 15)$

$= -\cos^2 15 = k\cos^2 15 \to$ **$k = -1$**

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$A = \sqrt{3}\cos(210)\sin(243) - \sqrt{2}\sin(135)\cos(153) \Rightarrow$

$\sqrt{3}\cos(180+30)\sin(270-27) - \sqrt{2}\sin(90+45)\cos(180-27) =$

$\sqrt{3}(-\cos 30)(-\cos 270) - \sqrt{2}(\sin 45)(-\cos(180-27)) = \sqrt{3}\left(\frac{\sqrt{3}}{2}\right)(\cos 27) + \sqrt{2}\left(\frac{\sqrt{2}}{2}\right) \times$

$(\cos 27) = \frac{3}{2}\cos 27 + \cos 27 = \frac{5}{2}\cos 27 \xrightarrow{-\cos 27} \frac{5/2 \cos 27}{\cos 27} = \frac{5}{2}$

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$f(\pi/24) = 16\cos^2(\pi/12)\cos^2(\pi/6)(\cos^2 \pi/3)\cos^2(2\pi/3)$

$\cos^2(\pi/12) = \cos^2 15 = \frac{1+\cos 30}{2} \rightarrow \cos^2 15 = \left(\frac{\sqrt{2+\sqrt{3}}}{2}\right)^2 = \frac{2+\sqrt{3}}{4}$

$f(\pi/24) = 16 \times \frac{2+\sqrt{3}}{4} \times 3/4 \times 1/4 \times 1/4 = \frac{6+3\sqrt{3}}{16}$

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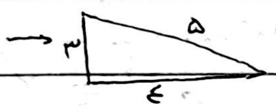
$\frac{1-\sin x}{1+\sin x} = 4 \rightarrow 1-\sin x = 4+4\sin x \rightarrow -3 = 5\sin x \rightarrow \sin x = -3/5$



$\rightarrow \cos x = 4/5 \xrightarrow{\text{ناحیه ۳}} \cos x = -4/5 \rightarrow \tan x/2 = \frac{\sin x}{1+\cos x} = \frac{-3/5}{1-4/5} = -3$

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(7) $\frac{\sin\theta}{1+\cos\theta} = \tan\frac{\theta}{2} \xrightarrow{\text{معکوس}} \frac{1+\cos\theta}{\sin\theta} = \cot\frac{\theta}{2}$

$\frac{1-\cos\theta}{\sin\theta} = \tan\frac{\theta}{2} \xrightarrow{\text{معکوس}} \frac{\sin\theta}{1-\cos\theta} = \cot\frac{\theta}{2}$

$\cot\frac{\theta}{2} + \cot\frac{\theta}{2} = 2\cot\frac{\theta}{2} \rightarrow k = 2$

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$\cos(11\pi/4 + \alpha)$; $\cos^2\alpha + \sin^2\alpha = 1 \xrightarrow{\text{ربع دوم}} \cos\alpha = -\sqrt{1-\sin^2\alpha} = -\sqrt{49/50} = \frac{-7}{5\sqrt{2}}$

$\cos(2\pi + 3\pi/4 + \alpha) = \cos(3\pi/4 + \alpha) = \cos\alpha\cos 3\pi/4 - \sin\alpha\sin 3\pi/4$

$\rightarrow \left(\frac{-7}{5\sqrt{2}} \times \frac{-\sqrt{2}}{2}\right) - \left(\frac{\sqrt{2}}{10} \times \frac{\sqrt{2}}{2}\right) = \frac{7}{10} - \frac{1}{10} = \frac{6}{10} = \frac{3}{5}$