تکلیف شماره ۲۸ — محسن نصری — یازدهم B

①

$\cot\alpha = \frac{\cos\alpha}{|\sin\alpha|}$ ⇝ $\frac{\cos\alpha}{\sin\alpha} = \frac{\cos\alpha}{|\sin\alpha|}$ ⇝ $\sin\alpha > 0$ (*) ⟹ ناحیه اول یا ثانی

$\frac{1}{|\cos\alpha|} - \frac{|\sin\alpha|}{\cos\alpha} = \frac{1-\sin\alpha}{|\cos\alpha|}$ (*: $\sin\alpha$)

$\times\frac{\cos\alpha}{\cos\alpha}$ ⟶ $\frac{\cos\alpha - |\cos\alpha|(\sin\alpha)}{|\cos\alpha|\cos\alpha} = \frac{\cos\alpha - \cos\alpha\sin\alpha}{|\cos\alpha|\cos\alpha}$ ⇝ $\cos\alpha > 0$

②

$\frac{\pi}{12} < x < \frac{5\pi}{12}$ ⇝ $-\frac{\pi}{6} < 2x < \frac{5\pi}{6}$ ⇝ $-\frac{1}{2} < \sin 2x < 1$ ⟶ $-\frac{1}{2} < \frac{m-1}{4} < 1$

⇒ $-2 < m-1 < 4$ ⟶ $-1 < m < 5$

③

$\tan\alpha + \cot\alpha < 0$ ($\tan\alpha\cdot\cot\alpha > 0$) ⟶ α در ناحیه ۲ یا ۴ (I)

$3\pi < 4x < \frac{9\pi}{2}$ ⟶ x در ناحیه ۳ یا ۴ (II)

$\frac{3\pi}{4} < x < \pi$

(I) و (II) ⟹ x در ناحیه ۴

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

$(\sin x + \cos x)^3 = \sin^3 x + \cos^3 x + 3\sin x\cos x(\sin x + \cos x)$ ⟶ $\sin^3 x + \cos^3 x = \frac{4\sqrt{2}}{9}$

$(\sin x + \cos x)^2 = \sin^2 x + \cos^2 x + 2\cos x\sin x$

$1 \quad -\frac{2}{3}$

$\Rightarrow \sin x + \cos x = \pm\frac{\sqrt{3}}{3}$ (x در ناحیه ۴) ⟶ $\sin x + \cos x = -\frac{\sqrt{3}}{3}$

$\frac{1}{\sin^3 x + \cos^3 x} = \frac{3\sqrt{3}}{4}$

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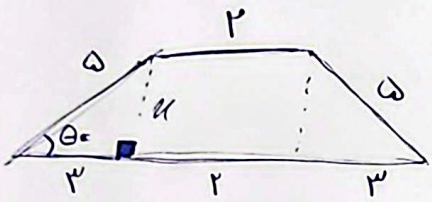
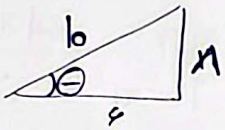
۴)



$\frac{x}{5} = \frac{8}{10} \rightarrow x = 4$

$\cos\theta = \frac{6}{10}$

$\sin\theta = \frac{8}{10}$



$S_{\text{ذوزنقه}} = \frac{4 \times (10)}{2} = 20$

۵)

$\tan(218^\circ)\tan(-142^\circ) - \sin(1080^\circ)\cos(200^\circ) = k\cos^2 10^\circ$

$\rightarrow -\cot 10^\circ \times \tan 10^\circ - \sin 10^\circ \times (-\sin 10^\circ) = k\cos^2 10^\circ$

$-1 + \sin^2 10^\circ = \cos^2 10^\circ \Rightarrow k = 1$

۶)

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

$\rightarrow \sqrt{3}\left(-\frac{\sqrt{3}}{2}\right) \times (-\cos 27^\circ) - \sqrt{2} \times \frac{\sqrt{2}}{2} \times (-\cos 27^\circ) = \frac{3}{2}\cos 27^\circ + \cos 27^\circ$

$= \frac{5}{2}\cos 27^\circ \xrightarrow{\div \cos 27^\circ} \frac{5}{2}$

۷)

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

$f\left(\frac{\pi}{24}\right) = ? \rightarrow 14 \times \cos^2\frac{\pi}{12} \times \cos^2\frac{\pi}{6} \times \cos^2\frac{\pi}{3} \times \cos^2\frac{2\pi}{3}$

$= 14 \times \frac{1+\frac{\sqrt{3}}{2}}{2} \times \frac{\sqrt{3}}{2} \times \frac{1}{2} \times \frac{1}{2} = \frac{2+\sqrt{3}}{8} \times \sqrt{3} = \frac{2\sqrt{3}+3}{8}$

۸)

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

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

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$$\frac{\sin\theta}{1-\cos\theta}+\frac{1+\cos\theta}{\sin\theta}=2\cot\frac{\theta}{2}\Rightarrow (K=1)$$ (۹)

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

$$\Rightarrow \sin\left(\frac{\pi}{4}+\alpha\right)=\frac{\sin\alpha+\cos\alpha}{\sqrt{2}}=\frac{\frac{\sqrt{2}}{10}+\frac{\sqrt{98}}{10}}{\sqrt{2}}=\frac{1+7}{10}=\left(\frac{8}{10}=\frac{4}{5}\right)$$ (۱۰)