محمد عقیلی پور

یازدهم سه شنبه دفتر

۱۹٫۷۵

سوال ۱)

$\cot x = \dfrac{\cos x}{\sqrt{1-\cos^2 x}} \Rightarrow \cot x = \dfrac{\cos x}{\sin x} = \dfrac{\cos x}{|\sin x|} \Rightarrow \sin x > 0$

$\dfrac{1}{|\cos x|} - \dfrac{\sin x}{\cos x} = \dfrac{1-\sin x}{|\cos x|} \Rightarrow \cos x > 0$

$\Rightarrow$ ناحیه اول

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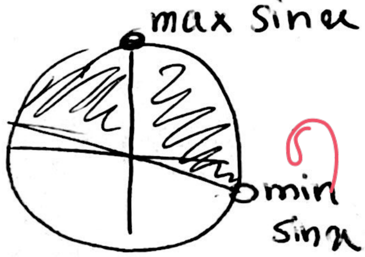
سوال ۲)

$-\dfrac{\pi}{12} < x < \dfrac{5\pi}{12} \qquad \sin 2x = \dfrac{m-1}{4}$

$\Rightarrow -\dfrac{\pi}{6} < 2x < \dfrac{5\pi}{6} \Rightarrow \dfrac{m-1}{4} \in \left(\sin -\dfrac{\pi}{6} , \dfrac{5\pi}{2}\right)$



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$\Rightarrow -\dfrac{1}{2} < \dfrac{m-1}{4} \leq 1 \Rightarrow -2 < m-1 \leq 4$

$-1 < m \leq 5$ یا $(-1, 5]$

سوال ۳)

$\tan x + \cot x = \dfrac{1}{\sin x \cos x} = -3 \Rightarrow \sin x \cos x = -\dfrac{1}{3}$

$\dfrac{1}{\sin^3 x + \cos^3 x} = \dfrac{1}{(\sin x + \cos x)(\sin^2 x + \cos^2 x - \sin x\cos x)} \Rightarrow \dfrac{1}{(\sin + \cos)(\frac{4}{3})}$

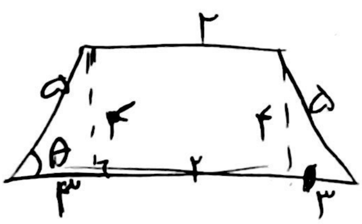
$1-(-\frac{1}{3})$

۱٫۷۵

$(\sin + \cos)^2 = \sin^2 + \cos^2 + 2\sin\cos \Rightarrow 1 + -\dfrac{2}{3} = \dfrac{1}{3}$

$\Rightarrow \sin + \cos = \sqrt{\frac{1}{3}} \Rightarrow \dfrac{1}{\sqrt{\frac{1}{3}} \times \frac{4}{3}} = \dfrac{3\sqrt{3}}{4}$

سوال ۴)



$\Rightarrow$

$\Rightarrow \dfrac{4 \times 10}{2} = 20$

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سوال ۵)

۱۰۹۵ = ۱۰۸۰ + ۱۵ ، دور کامل ⇐ ۳۶۰ × ۳

$\theta = 15^\circ$

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

$-\cot\theta \times \tan\theta - \sin\theta \times -\sin\theta$

$-1 + \sin^2\theta \Rightarrow -(1-\sin^2\theta) = \cos^2\theta \Rightarrow \boxed{k = -1}$

(۶)

سوال ۶)

$A = \sqrt{3}\,\underbrace{\cos(210)}_{-\frac{\sqrt{3}}{2}}\,\sin(\frac{3\pi}{2}-\theta) - \sqrt{2}\,\underbrace{\sin(135)}_{\frac{\sqrt{2}}{2}} \times \cos(\pi-\theta)$

$-\frac{3}{2} \times -\cos\theta - (1 \times -\cos\theta) = \frac{3}{2}\cos\theta + \cos\theta = \frac{5}{2}\cos\theta$

(۶)

سوال ۷)

$16\,\underbrace{\cos^2(\frac{\pi}{12})} \times \underbrace{\cos^2(\frac{\pi}{6})}_{\frac{3}{4}} \times \underbrace{\cos^2(\frac{\pi}{3})}_{\frac{1}{4}} \times \underbrace{\cos^2(\frac{2\pi}{3})}_{\frac{1}{4}}$

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

$\Rightarrow 16 \times \frac{2+\sqrt{3}}{4} \times \frac{3}{4} \times \frac{1}{4} = \frac{3(2+\sqrt{3})}{16} = \frac{6+3\sqrt{3}}{16}$

(۶)

سوال ۸)

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

$\Rightarrow \tan\frac{x}{2} = \frac{\sin\frac{x}{2}}{\cos\frac{x}{2}} \Rightarrow \sqrt{\frac{1-\cos 2a}{1+\cos 2a}} = \sqrt{\frac{1+\frac{4}{5}}{1-\frac{4}{5}}} = \sqrt{\frac{\frac{9}{5}}{\frac{1}{5}}} = 3$

ناحیه سوم = (۱۸۰ , ۲۷۰) $\xrightarrow{\div 2}$ (۹۰ , ۱۳۵) ناحیه دوم ⇐ tan منفی است ⇐ ۳−

(۶)

سوال ۹) حل تعد

$\frac{\sin(1+\cos)}{\sin^2} + \frac{1+\cos}{\sin} = (\frac{1+\cos}{\sin}) \times 2$ ، $\sin^2 = 1-\cos^2$

$\sqrt{\frac{1+\cos\theta}{1-\cos\theta}} \leftarrow \sqrt{\frac{(1+\cos\theta)^2}{\sin^2}} \Rightarrow \left|\frac{1+\cos}{\sin}\right|$ قدر مطلق

(سوال ۹ دوباره ...)

سوال ۹)

$$\frac{\sin\theta}{1-\cos\theta} + \frac{1+\cos\theta}{\sin\theta}$$

$$\frac{\sin\theta}{1-\cos\theta} \to \frac{\sin\theta(1+\cos\theta)}{\frac{1-\cos^2\theta}{\sin^2\theta}}$$

$$\Rightarrow \frac{1+\cos\theta}{\sin} + \frac{1+\cos\theta}{\sin\theta} = (2)\left(\frac{1+\cos\theta}{\sin\theta}\right)$$

$$\cot\frac{\theta}{2} = \frac{\cos\frac{\theta}{2}}{\sin\frac{\theta}{2}} = \sqrt{\frac{1+\cos\theta}{1-\cos\theta}} = \sqrt{\frac{(1+\cos\theta)^2}{\sin^2\theta}}$$

$$\Rightarrow \left|\frac{1+\cos\theta}{\sin\theta}\right| \Rightarrow k=2$$

سوال ۱۰) $\frac{6}{10}$ تا $\frac{3}{5}$

$$\cos\left(\frac{11\pi}{4}+a\right) = \cos\frac{11\pi}{4}\times\cos\alpha - \sin\frac{11\pi}{4}\times\sin\alpha$$

$$= -\frac{\sqrt{2}}{2}\times -\frac{\sqrt{98}}{10} - \frac{\sqrt{2}}{2}\times\frac{\sqrt{2}}{10} = \frac{14}{20}-\frac{2}{20} = \frac{12}{20}$$

$$* \quad 1-\left(\frac{\sqrt{2}}{10}\right)^2 = \cos^2\alpha \Longrightarrow |\cos\alpha| = \frac{\sqrt{98}}{10} \xrightarrow{\text{ناحیه ۲}} -\frac{\sqrt{98}}{10}$$
