حسنا رضایی / تکلیف ۲۸ / دهم C

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1

$$\frac{1}{\sqrt{\frac{\cos^2\alpha}{|\cos\alpha|}}} - \frac{1}{\cot\alpha} = \frac{1-\sin\alpha}{|\cos\alpha|} \rightarrow \frac{1-\left(\frac{\sin\alpha}{1+\sin\alpha}\right)}{|\cos\alpha|} = \frac{\frac{1}{\cos\alpha}}{\frac{\sin\alpha}{\cos\alpha}}$$

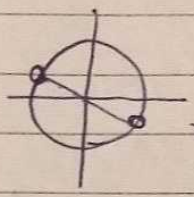
$|\cos\alpha| = \cos\alpha$ ، $\cos\alpha > 0$

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

α در ناحیه اول

2

$$-\frac{\pi}{12} < x < \frac{5\pi}{12} \rightarrow -\frac{\pi}{4} < 2x < \frac{5\pi}{4}$$



$$-\frac{1}{2} < \sin 2x \leq 1$$

$$\sin 2x = \frac{m-1}{3}$$

$$-\frac{1}{2} < \frac{m-1}{3} \leq 1 \rightarrow -2 < m-1 \leq 4$$

$$-1 < m \leq 5 \rightarrow (-1, 5]$$

3

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$$\frac{1}{\sin^4 x + \cos^4 x} = \frac{1}{(\sin^2 x + \cos^2 x)^2 - 2\sin^2 x \cos^2 x} = \frac{9}{6} = \frac{9\sqrt{3}}{12} = \frac{3\sqrt{3}}{4}$$

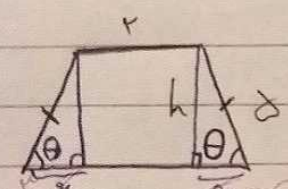
$$\pi < x < \frac{4\pi}{3} \rightarrow 3\pi < 4x < 4\pi$$

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

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

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

4



$$\cos\theta = 0.4 \rightarrow \frac{x}{5} = \frac{4}{10} \rightarrow x = 2 \rightarrow h^2 = 25 - 4 \rightarrow h = 3\sqrt{21}$$

$$\frac{(2+8)\times 3\sqrt{21}}{2} = 15\sqrt{21}$$

5

$$\tan(285^\circ) + \tan(-145) - \sin(1095^\circ)\cos(2880^\circ) = k\cos^2 15$$

$$\tan\left(\frac{3\pi}{2} + 15\right) + \tan(15 - \pi) - \sin(90\pi + 15)\cos\left(\frac{5\pi}{2} - 15\right)$$

$$-\cot 15 \quad -\tan(\pi - 15) \quad -\sin 15$$

$$\tan 15 \quad -\sin 15$$

$$-1 + \sin^2 15 \rightarrow -\cos^2 15$$

$$k = -1$$

۴) $A = \sin 70 \times \frac{-\sqrt{3}}{2} \times \sin(270 - 27) - \sin 20 \times \frac{\sqrt{2}}{2} \cos(180 - 27)$

$A = \sqrt{3}\cos(\frac{11\pi}{6})\sin(240^\circ) - \sqrt{2}\sin(135^\circ)\cos(135^\circ) - 2k\cos(270^\circ)$ — $k=-\frac{1}{2}$ — 6

$k=0$

$\frac{\sqrt{3}}{2}$ — $\frac{\sqrt{2}}{2}$

$+\frac{3}{2}\cos(135^\circ)\left\{-\frac{3}{2}\sin(240^\circ) - \cos(135^\circ)\right.$ — $(\frac{3\pi}{2} + 135^\circ)$

$\hookrightarrow \frac{3}{2}\cos(135^\circ) - \cos(135^\circ)$

$\frac{1}{2}\cos(45^\circ) \rightarrow \frac{1}{2}\cos 45$ — $(\pi - 45)$ — ①

$f(x) = 14\cos^2(2x)\cos^2(4x)\cos^2(12x)\cos^2(24x)\sin^2(24x)$

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

$\hookrightarrow 4\sin^2(4x)\cos^2(2x) \hookrightarrow 4\sin^2(8x)\cos^2(4x) \rightarrow \cos^2(12x)\sin^2(12x)\cos^2(24x)$

$\sin^2(8x)$ — $\sin^2(12x)$ — $\frac{1}{4}\sin^2(24x)$

$\frac{\sin^2(48x)}{14\sin^2(24x)} = \frac{\sin^2(48\cdot\frac{\pi}{24})}{14\times\sin^2(\frac{\pi}{12})} \rightarrow \frac{(\frac{\sqrt{3}}{2})^2}{14(\frac{2-\sqrt{3}}{4})} \rightarrow \frac{3}{8}$ — $\frac{1}{14}\sin^2(48x)$ — $\frac{1\times\frac{3}{4}}{14(2-\sqrt{3})} \hookrightarrow \frac{3(2+\sqrt{3})}{14}$ — $\frac{4+3\sqrt{3}}{14}$ — 7

$x \rightarrow \pi < x < \frac{3\pi}{2} \rightarrow \cos x < 0$, $\sin x < 0$

$\frac{1-\sin x}{1+\sin x} = 8$ — 8

$\hookrightarrow 1 - \sin x = 8 + 8\sin x$

$\hookrightarrow 9\sin x = -7$

$\hookrightarrow \sin x = -\frac{7}{9}$

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

$\hookrightarrow \frac{\sin x}{1+\cos x} = \frac{-\frac{7}{9}}{\frac{2}{9}} = -7$ — $\cos x = -\frac{8}{9}$

$\frac{\sin\theta}{1-\cos\theta} + \frac{1+\cos\theta}{\sin\theta} = 2k\cot\frac{\theta}{2}$ — $k=2$ — 9

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

$\frac{\pi}{2} < \alpha < \pi \rightarrow \cos\alpha < 0$ ① — $\sin\alpha > 0$ — 10

$\sin\alpha = \frac{\sqrt{7}}{4} \rightarrow \cos^2\alpha + \sin^2\alpha = 1 \rightarrow \cos^2\alpha = \frac{9}{16} \rightarrow \cos\alpha = -\frac{3}{4}$ — ①

$\cos(11\pi + \alpha) = ?$

$\hookrightarrow 2\pi + \frac{3\pi}{4} + \alpha \rightarrow \cos(2\pi + \theta) \rightarrow \cos\theta \rightarrow \cos(\frac{3\pi}{4} + \alpha)$

θ

$\cos\frac{3\pi}{4}\cos\alpha - \sin\frac{3\pi}{4}\sin\alpha$

$-\frac{\sqrt{2}}{2}\alpha - \frac{\sqrt{2}}{2}\alpha = -\frac{3\sqrt{2}}{4}\alpha\frac{\sqrt{7}}{4}$

$\frac{7}{16} = \frac{9}{16} - \frac{1}{16}$