۱ ۱ حسنا رضایی / تکلیف ۲۸ / دفتر C

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

$\sqrt{\cos^2\alpha} = |\cos\alpha|$

↳ $|\cos\alpha| = \cos\alpha$ ↳ $\boxed{\cos\alpha > 0}$ $\qquad \frac{\sin\alpha}{\cos\alpha}$

$\frac{\cos\alpha}{\sin\alpha}\ \cot\alpha = \frac{\cos\alpha}{\sqrt{1-\cos^2\alpha}} \leadsto \frac{\cos\alpha}{\sin\alpha} = \frac{\cos\alpha}{|\sin\alpha|} \leadsto |\sin\alpha| = \sin\alpha \leadsto \boxed{\sin\alpha > 0}$ α در ناحیه اول

$-\frac{\pi}{12} < x < \frac{5\pi}{12} \leadsto -\frac{\pi}{6} < 2x < \frac{5\pi}{6}$

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

$\sin 2x = \frac{m-1}{4}$ 2

↳ $-\frac{1}{2} < \frac{m-1}{4} \leqslant 1 \to -2 < m-1 \leqslant 4$

$-1 < m \leqslant 5 \leadsto (-1, 5]$

$\frac{1}{\sin^3x+\cos^3x} = \frac{1}{\underbrace{(\sin x+\cos x)}_{\frac{\sqrt3}{3}}\underbrace{(\sin^2x+\cos^2x-\sin x\cos x)}_{1+\frac{1}{3}=\frac{4}{3}}} = \frac{9}{4\sqrt3} = \frac{9\sqrt3}{12} \to \frac{3\sqrt3}{4}$ 3

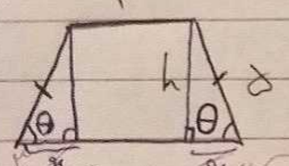
$\sin x+\cos x = \frac{\sqrt3}{3}$

$\frac{1}{3}$

$3\pi < 4x < 4\pi$

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

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



$\cos\theta = 0.6 \qquad \to 3+3+2 = 8 \qquad \frac{(2+8)\times 4}{2} = 20$ 4

↳ $\frac{x}{5} = \frac{6}{10} \to x = 3 \to h^2 = 25-9 = 16 \to h = 4$

$\tan(285°)\tan(-195°) - \sin(1095°)\cos(255°) = k\cos^2 15$

$\underbrace{\tan(\frac{3\pi}{2}+15)}_{-\cot 15} \cdot \underbrace{\tan(15-\pi)}_{-\tan(\pi-15)} - \sin\underbrace{(1080+15)}_{6\pi+15}\ \underbrace{\cos(\frac{3\pi}{2}-15)}_{-\sin 15}$ 5

$-\sin 15 \qquad \tan 15$

$\boxed{k = -1}$

$-1 + \sin^2 15$

↳ $\sin^2 15 - 1 \leadsto -\cos^2 15$

Parsian

$$A = \sqrt{3}\,\underbrace{\cos(210^\circ)}_{-\frac{\sqrt{3}}{2}}\sin(243^\circ) - \sqrt{2}\,\underbrace{\sin(135^\circ)}_{\frac{\sqrt{2}}{2}}\cos(153^\circ) = k\cos(27^\circ)$$ 6

$k = ?$ $\boxed{k = -\frac{1}{2}}$

$$\left\{ -\frac{3}{2}\sin(243) - \cos(153) \right.$$

$$+\frac{3}{2}\cos(153) \quad \underset{\frac{\pi}{2}}{(\cancel{\pi} + 153)} \quad \hookrightarrow \frac{3}{2}\cos(153) - \cos(153)$$

$$\frac{1}{2}\cos\overset{(\pi - 27)}{\cancel{153}} \to -\frac{1}{2}\cos 27$$

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

$\times \sin^2(3x)$

$$f\left(\frac{\pi}{36}\right) = ? \quad \hookrightarrow \frac{\cancel{16}\,4\sin^2(3x)\cos^2(3x)}{\sin^2(6x)} \hookrightarrow \frac{4\sin^2(6x)\cos^2(6x)}{\sin^2(12x)} \to \frac{\cos^2(12x)\sin^2(12x)\cos^2(24x)}{\frac{1}{4}\sin^2(24x)}$$ 7

$$\frac{1}{16}\sin^2(48x)$$

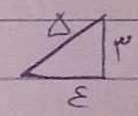
$$\frac{\sin^2(48x)}{16\sin^2(3x)} = \frac{\sin^2\left(\frac{4\pi}{3}\right)}{16\times\sin^2\left(\frac{\pi}{12}\right)} \to \frac{\left(\frac{-\sqrt{3}}{2}\right)^2 \to \frac{3}{4}}{16\left(\frac{1-\cos\frac{\pi}{6}}{2}\right) \to 16\left(\frac{2-\sqrt{3}}{4}\right)}$$

$$\frac{1}{16}\times\frac{3}{(2-\sqrt{3})} \to \frac{3(2+\sqrt{3})}{16} \hookrightarrow \boxed{\frac{6+3\sqrt{3}}{16}}$$

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

$$\frac{1-\sin x}{1+\sin x} = 4 \hookrightarrow 1 - \sin x = 4 + 4\sin x$$ 8

$$\hookrightarrow 5\sin x = -3$$



$$\tan\frac{x}{2} = ? \qquad \hookrightarrow \sin x = -\frac{3}{5}$$

$$\hookrightarrow \frac{\sin x}{1+\cos x} = \frac{-\frac{3}{\cancel{5}}}{\frac{1}{\cancel{5}}} = -3 \qquad \cos x = -\frac{4}{5}$$

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

$$\frac{\sin^2\theta + 1 - \cancel{\cos^2\theta}}{(1-\cos\theta)\sin\theta} = \frac{2\cancel{\sin^2\theta}}{(1-\cos\theta)\cancel{\sin\theta}} \to \frac{2\sin\theta}{1-\cos\theta} \Big\} \ 2\left(\cot\frac{\theta}{2}\right)$$

$$\frac{\pi}{2} < \alpha < \pi \to \cos\alpha < 0 \ (1), \quad \sin\alpha > 0$$

$$\sin\alpha = \frac{\sqrt{2}}{10} \to \cos^2\alpha + \underset{\frac{2}{100}}{\cancel{\sin^2\alpha}} = 1 \to \cos^2\alpha = \frac{98}{100} \to \pm\frac{7\sqrt{2}}{10} \xrightarrow{(1)} -\frac{7\sqrt{2}}{10}$$ 10

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

Parsian

$$2\pi + \underbrace{\frac{3\pi}{4} + \alpha}_{\theta} \to \cos(2\pi + \theta) \to \cos\theta \hookrightarrow \cos\left(\frac{3\pi}{4} + \alpha\right)$$

$$\boxed{\frac{6}{10}} = \frac{7}{10} - \frac{1}{10} \quad \left\{ -\frac{\sqrt{2}}{2}\times -\frac{7\sqrt{2}}{10} - \frac{\sqrt{2}}{2}\times\frac{\sqrt{2}}{10} \right. \leftarrow \cos\frac{3\pi}{4}\cos\alpha - \sin\frac{3\pi}{4}\sin\alpha$$