مهندس عطار — ۱۴,۵ — ملیکا محمد حسینی

(۱) ۰/۵

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

$$\frac{1}{|\cos\alpha|} - \tan\alpha = \frac{1}{|\cos\alpha|} - \frac{\sin\alpha}{|\cos\alpha|} = \frac{1-\sin\alpha}{|\cos\alpha|}$$

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

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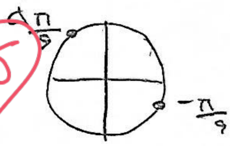
(۲) ۲

$$\frac{-\pi}{12} < x < \frac{5\pi}{12} \longrightarrow -\frac{\pi}{6} < 2x < \frac{5\pi}{6} \longrightarrow -\frac{1}{2} < \sin 2x \le 1$$

$$-\frac{1}{2} < \frac{m-1}{4} \le 1 \xrightarrow{\times 4} -2 < m-1 \le 4 \longrightarrow -1 < m \le 5$$



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(۳) ۱/۷۵

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

$$A = \frac{1}{\sin^3 x + \cos^3 x} \longrightarrow \frac{1}{A} = \sin^3 x + \cos^3 x \longrightarrow \frac{1}{A^2} = \sin^6 x + \cos^6 x + 2\sin^3 x\cos^3 x$$

$$1 - 3\sin^2 x\cos^2 x + 2\sin^3 x\cos^3 x \longrightarrow 1 - 3\left(\frac{1}{9}\right) + 2\left(-\frac{1}{27}\right) = \frac{16}{27} = \frac{1}{A^2}$$

$$A = \pm\frac{3\sqrt{3}}{4} = \pm\ 0/75\sqrt{3}$$

$$\frac{3\pi}{4} < x < \pi \longrightarrow \sin x > 0,\ \cos x < 0 \qquad |\cos x| > \sin x$$

$$\sin^3 x + \cos^3 x < 0$$

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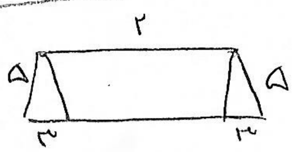

$$\frac{6}{10} = \frac{x}{5} \longrightarrow x = 3$$

ارتفاع $= 8$

$$S = \frac{8 \times 4}{2} = 16$$

$$\cos\theta = \frac{x}{5} = \frac{6}{10} \quad (x \to 3)$$

$$\sin\theta = \frac{h}{5} = \frac{8}{10} \quad (h \to 4)$$

$$S = \frac{(2+8)}{2} \times 4 = 20$$

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$$\tan 285 = \tan(270 + 15) = -\cot 15$$

$$\tan(-165) = -\tan 165 = -\tan(180 - 15) = \tan 15$$

$$\cos 255 = \cos(270 - 15) = -\sin 15$$

$$\sin 1095 = \sin(6 \times 180 + 15) = \sin 15$$

$$-\cot 15 \times \tan 15 - \sin 15 \times -\sin 15 = -1 + \sin^2 15$$

$$-(1 - \sin^2 15) = -\cos^2 15 \longrightarrow k = -1$$

مهندس عطار

ملیکا محمد حسینی

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$$\frac{3}{4}\cos 2v + \cos 2v = 3{,}5\cos 2v$$

$$\sqrt{3} \times -\frac{\sqrt{3}}{2} \times -\cos 2v - \sqrt{2} \times \frac{\sqrt{2}}{2} \times -\cos 2v = 3{,}5$$

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$$f\left(\frac{\pi}{24}\right) = 16\cos^2\left(\frac{\pi}{12}\right)\cos^2\left(\frac{\pi}{6}\right)\cos^2\frac{\pi}{3}\cos^2\left(2\frac{\pi}{3}\right) \to \cos^2\left(\pi - \frac{\pi}{3}\right) = \left(-\cos\frac{\pi}{3}\right)^2 = \frac{1}{4}$$

$$f\left(\frac{\pi}{24}\right) = 16\cos^2\left(\frac{\pi}{12}\right) \times \frac{3}{4} \times \frac{1}{4} \times \frac{1}{4} = \frac{3}{4}\cos^2\left(\frac{\pi}{12}\right) = \frac{3}{4} \times \frac{2+\sqrt{3}}{4} = \frac{6+3\sqrt{3}}{16}$$

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

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

$$\sin 2x = \frac{2\tan x}{1+\tan^2 x} \to \sin x = \frac{2\tan\frac{x}{2}}{1+\tan^2\frac{x}{2}} = -\frac{3}{5} \to -10\tan\frac{x}{2} = 3 + 3\tan^2\frac{x}{2} \to$$

$$3\tan^2\frac{x}{2} + 10\tan\frac{x}{2} + 3 = 0 \qquad \tan\frac{x}{2} = \frac{-5 \pm \sqrt{25-9}}{3}$$

-3 غ ق ق

$-\frac{1}{3}$ ق ق ق

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۹ ۱,۷۵

$$\frac{\sin\theta}{1-\cos\theta} + \frac{1+\cos\theta}{\sin\theta} = \frac{2\sin\frac{\theta}{2}\times\cos\frac{\theta}{2}}{2\sin^2\frac{\theta}{2}} + \frac{2\cos^2\frac{\theta}{2}}{2\sin\frac{\theta}{2}\cdot\cos\frac{\theta}{2}} = \frac{\cos\frac{\theta}{2}}{\sin\frac{\theta}{2}} + \frac{\cos\frac{\theta}{2}}{\sin\frac{\theta}{2}} = 2\cot\frac{\theta}{2}$$

$$\frac{\frac{\sqrt{3}}{2}}{\frac{1}{2}} + \frac{\frac{3}{2}}{\frac{\sqrt{3}}{2}} = \sqrt{3} + \sqrt{3} = 2\sqrt{3}$$

باید به ازای $\frac{\pi}{3} = \theta$ جواب هم $2\sqrt{3}$ شود پس ←

$k=2$

۱۰ ۰

$$\cos\left(2\pi + \frac{3\pi}{4} + \alpha\right) \to \cos\left(3\frac{\pi}{4} + \alpha\right) \to \sin\alpha = \frac{\sqrt{2}}{10}$$

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

$$\to \frac{-\sqrt{2}}{2}(\cos\alpha + \sin\alpha) \qquad \cos\alpha = \frac{-7\sqrt{2}}{10}$$

$$\to \frac{-\sqrt{2}}{2}\left(\frac{-7\sqrt{2}}{10} + \frac{\sqrt{2}}{10}\right) = \frac{3}{5}$$

1) $\cot\alpha = \dfrac{\cos\alpha}{\sin\alpha} = \dfrac{\cos\alpha}{|\sin\alpha|} \rightarrow |\sin\alpha| = \sin\alpha \rightarrow \sin\alpha > 0$

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

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