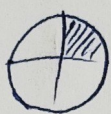


$$\cot \alpha = \frac{\cos \alpha}{\sqrt{1 - \cos^2 \alpha}} \rightarrow \frac{\cos \alpha}{\sin \alpha} = \frac{c \alpha}{| \sin \alpha |} \Rightarrow | \sin \alpha | = \sin \alpha \rightarrow \sin \alpha > 0$$

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

$\alpha \rightarrow$ ربع اول $\Rightarrow \begin{cases} c \alpha > 0 \\ \sin \alpha > 0 \end{cases} \rightarrow$  \rightarrow ربع اول

$$-\frac{\pi}{4} < \alpha < \frac{5\pi}{4} \rightarrow -\frac{\pi}{4} < \gamma \alpha < \frac{5\pi}{4}$$

$$\sin \alpha = \frac{m-1}{f} \rightarrow \sin \gamma \alpha = \frac{m-1}{f}$$

m مجموعی تعداد = ؟ $\rightarrow -\frac{1}{f} < \frac{m-1}{f} < 1 \xrightarrow{\times f} -1 < m-1 < f$

$\Rightarrow -1 < m < f+1$

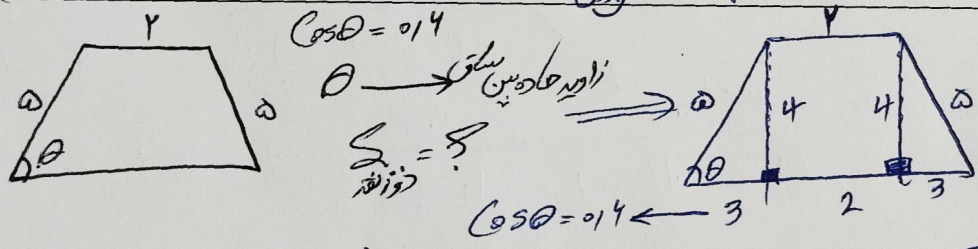
$$\tan \alpha + \cot \alpha = -\mu \rightarrow \frac{\sin \alpha}{\cos \alpha} + \frac{\cos \alpha}{\sin \alpha} = -\mu \rightarrow \frac{\sin^2 \alpha + \cos^2 \alpha}{\sin \alpha \cos \alpha} = -\mu \rightarrow 1 = -\mu \sin \alpha \cos \alpha$$

$$\mu \pi < \gamma \alpha < f \pi \rightarrow \frac{\mu}{f} \pi < \alpha < \pi \rightarrow \sin \alpha + \cos \alpha < 0 \rightarrow \sin \alpha \cos \alpha = -\frac{1}{\mu}$$

$$\frac{1}{\sin^3 \alpha + \cos^3 \alpha} \rightarrow \frac{1}{(\sin \alpha + \cos \alpha)(\sin^2 \alpha + \cos^2 \alpha - \sin \alpha \cos \alpha)} = \frac{1}{(\sin \alpha + \cos \alpha)(1 + \frac{1}{\mu})} = \frac{1}{\frac{f}{\mu}(\sin \alpha + \cos \alpha)}$$

$$(\sin \alpha + \cos \alpha)^2 = \sin^2 \alpha + \cos^2 \alpha + 2 \sin \alpha \cos \alpha = 1 - \frac{2}{\mu} = \frac{\mu - 2}{\mu} \rightarrow \sin \alpha + \cos \alpha = \pm \sqrt{\frac{\mu - 2}{\mu}}$$

$\rightarrow \frac{1}{-\frac{f}{\mu} \cdot \frac{1}{\sqrt{\mu}}} = \frac{1}{-\frac{f}{\mu \sqrt{\mu}}} = \frac{-\mu \sqrt{\mu}}{f}$



$$\sum \text{زونده} = \frac{(\text{مجموع دوکدام}) \cdot h}{y} = \frac{(y+1) \times f}{y} = \frac{f \cdot 0}{y} = 20$$

$$\tan(180^\circ) \tan(-140^\circ) - \sum (1090) \cos(140^\circ) = K \cos 10^\circ \Rightarrow \alpha = 10^\circ$$

$$K = 5 \rightarrow \tan(180^\circ + \alpha) \tan(-(110^\circ - \alpha)) - \sum (1090 + \alpha) \cos(180^\circ - \alpha)$$

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

$$\rightarrow -\cos^2 \alpha = K \cos^2 \alpha \Rightarrow K = -1$$

$$A = \sqrt{y} \cos(210) \sin(4\sqrt{y}) - \sqrt{y} \sin(135) \cos(10\sqrt{y})$$

$$\frac{A}{\cos(2\sqrt{y})} = ? \rightarrow \begin{cases} \cos 210 = -\frac{\sqrt{3}}{2} \\ \sin 135 = \frac{\sqrt{2}}{2} \end{cases} \rightarrow A = \sqrt{y} \cdot \left(-\frac{\sqrt{3}}{2}\right) \cdot \sin(4\sqrt{y}) - \sqrt{y} \cdot \left(\frac{\sqrt{2}}{2}\right) \cdot \cos(10\sqrt{y})$$

$$\Rightarrow \begin{cases} \sin 4\sqrt{y} = \sin(180 + 4\sqrt{y}) \\ \cos 10\sqrt{y} = -\cos 2\sqrt{y} \end{cases} \rightarrow \begin{matrix} \text{Diagram 1: Circle with angle } 4\sqrt{y} \\ \text{Diagram 2: Circle with angle } 2\sqrt{y} \end{matrix} \rightarrow \begin{aligned} \sin 4\sqrt{y} &= -\sin 4\sqrt{y} = -\cos 2\sqrt{y} \\ \cos 10\sqrt{y} &= -\cos 2\sqrt{y} \end{aligned}$$

$$\Rightarrow \frac{A}{\cos 2\sqrt{y}} = \frac{-\frac{\sqrt{3}}{2}(-\cos 2\sqrt{y}) - \frac{\sqrt{2}}{2}(-\cos 2\sqrt{y})}{\cos 2\sqrt{y}} = \frac{\frac{\sqrt{3} + \sqrt{2}}{2} \cos 2\sqrt{y}}{\cos 2\sqrt{y}} = \frac{\sqrt{3} + \sqrt{2}}{2}$$

$$f(x) = 14 \cos^2(3x) \cos^2(4x) \cos^2(12x) \cos^2(16x)$$

$$f\left(\frac{\pi}{24}\right) = ? \rightarrow f\left(\frac{\pi}{24}\right) = 14 \cos^2\left(\frac{\pi}{8}\right) \cos^2\left(\frac{\pi}{6}\right) \cos^2\left(\frac{\pi}{2}\right) \cos^2\left(\frac{2\pi}{3}\right)$$

$$= 14 \left(\frac{1 + \cos \frac{\pi}{4}}{2}\right) \left(\frac{\sqrt{3}}{2}\right)^2 \left(\frac{1}{2}\right)^2 \left(-\frac{1}{2}\right)^2 = \frac{14}{8} (1 + \frac{\sqrt{2}}{2}) = \frac{4 + 3\sqrt{2}}{2}$$

$$x \rightarrow \text{طرفین ضرب} \Rightarrow 1 - \sin x = x + x \sin x \Rightarrow \sin x = -\frac{x}{2}$$

$$\frac{1 - \sin x}{1 + \sin x} = x \rightarrow \sin 2x = \frac{2 \tan x}{1 + \tan^2 x} \rightarrow \sin x = \frac{2 \tan \frac{x}{2}}{1 + \tan^2 \frac{x}{2}} \rightarrow \tan \frac{x}{2} = m \rightarrow -\frac{x}{2} = \frac{2m}{1+m^2}$$

$$\tan \frac{x}{2} = ? \Rightarrow x + 2m^2 = -10m \rightarrow 2m^2 + 10m + x = 0 \rightarrow (2m+1)(m+x) = 0$$

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

$$\frac{\sin \theta}{1 - \cos \theta} + \frac{1 + \cos \theta}{\sin \theta} = k \cot \frac{\theta}{2} \rightarrow \theta = 40^\circ \rightarrow \frac{\sin^2 + 1 - \cos^2}{(1 - \cos)(\sin)} = \frac{\sin^2 + \sin^2}{(1 - \cos)(\sin)}$$

$$k = ? \rightarrow \frac{\sin 40}{1 - \cos 40} + \frac{1 + \cos 40}{\sin 40} = \frac{2 \sin^2 20}{(1 - \cos 40)(\sin 40)} = \frac{2 \cdot \frac{1}{4}}{\left(1 - \frac{1}{2}\right) \left(\frac{\sqrt{3}}{2}\right)} = \frac{1}{\frac{\sqrt{3}}{2}}$$

$$\sin 40 = \frac{\sqrt{3}}{2}, \cos 40 = \frac{1}{2} \rightarrow \frac{\frac{\sqrt{3}}{2} \times \frac{1}{2}}{\frac{\sqrt{3}}{2} \times \frac{1}{2}} = \frac{2\sqrt{3}}{2} = k \cot(20) \rightarrow k = 2$$

$$x \rightarrow 2\sqrt{10} \rightarrow \begin{cases} C(\alpha \pm \beta) = C\alpha C\beta \mp S\alpha S\beta \\ C\left(\frac{11\pi}{6} + \alpha\right) = C\frac{11\pi}{6} C\alpha - S\frac{11\pi}{6} S\alpha \end{cases}$$

$$\cos\left(\frac{11\pi}{6} + \alpha\right) = ? \Rightarrow \cos \frac{11\pi}{6} = -\frac{\sqrt{3}}{2}$$

$$\left(-\frac{\sqrt{3}}{2} \cdot \frac{\sqrt{98}}{10}\right) - \left(\frac{\sqrt{2}}{2} \cdot \frac{\sqrt{2}}{2}\right)$$

$$\Rightarrow \begin{cases} \sin \alpha = \frac{\sqrt{2}}{2} \\ \cos \alpha = -\frac{\sqrt{98}}{10} \end{cases} \rightarrow \frac{\sqrt{194}}{20} - \frac{1}{20} = \frac{19 - 1}{20} = \frac{18}{20} = \frac{9}{10}$$