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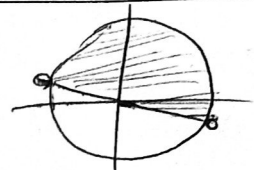
$$\frac{1}{\sqrt{\cot^2 \alpha}} - \frac{1}{\cot \alpha} = \frac{1 - \sin \alpha}{|\cos \alpha|} \rightarrow \frac{1}{|\cos \alpha|} - \frac{\sin \alpha}{\cos \alpha} = \frac{1 - \sin \alpha}{|\cos \alpha|} \rightarrow \cos \alpha = |\cos \alpha| \rightarrow \cos \alpha > 0$$

$$\cot \alpha = \frac{\cos \alpha}{\sin \alpha} = \frac{\cos \alpha}{|\sin \alpha|} \rightarrow \sin \alpha = |\sin \alpha| \rightarrow \sin \alpha > 0$$

$\Rightarrow \begin{cases} \sin \alpha > 0 \\ \cos \alpha > 0 \end{cases} \rightarrow$ یونانی ✓

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$$-\frac{\pi}{12} < \alpha < \frac{\pi}{12} \xrightarrow{xy} -\frac{\pi}{4} < \alpha < \frac{\pi}{4}$$



$$\Rightarrow -\frac{1}{\sqrt{2}} < \sin \alpha \leq 1 \Rightarrow -\frac{1}{\sqrt{2}} < \frac{m-1}{2} \leq 1 \Rightarrow -2 < m-1 \leq 4$$

\Rightarrow -1 < m ≤ 4 ✓

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

$$\rightarrow 1 = -3 \sin \alpha \cos \alpha \rightarrow \sin \alpha \cos \alpha = -\frac{1}{3}$$

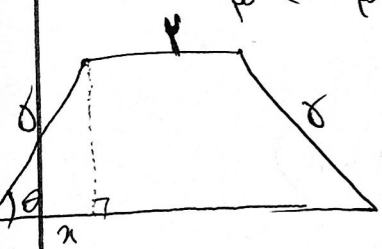
$$\frac{\sin^2 \alpha + \cos^2 \alpha}{\sin \alpha \cos \alpha} = \frac{(\sin \alpha + \cos \alpha)(\sin \alpha + \cos \alpha + \sin \alpha \cos \alpha)}{(\sin \alpha + \cos \alpha)(1 + \frac{1}{3})} = \frac{1}{-\frac{1}{3}}$$

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

$$\Rightarrow \frac{1}{\sqrt{3}} \left(-\frac{1}{\sqrt{3}} \right) = \frac{1}{-3} = -\frac{1}{3}$$

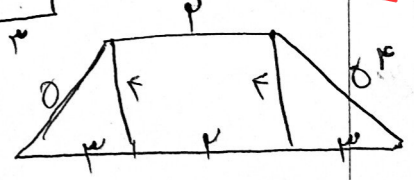
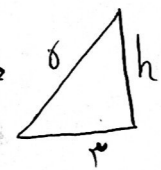


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$$\cos \theta = \frac{n}{s} = \frac{1}{2} \rightarrow n = 3$$

$$\rightarrow h^2 + (3)^2 = s^2 \rightarrow h = 4$$



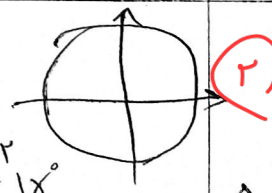
$$\Rightarrow \text{مساحت} = \frac{p(n+h)}{2} = 10$$

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$$\tan(45^\circ + 18^\circ) \tan(18^\circ - 18^\circ) - \sin(4 \times 18^\circ + 18^\circ) \cos(2 \times 18^\circ - 18^\circ) =$$

$$-\cot^2(18^\circ) \tan(18^\circ) - \sin(18^\circ)(-\sin 18^\circ) = -1 + \sin^2 18^\circ = -\cos^2 18^\circ$$

$$\Rightarrow -\cos^2 18^\circ = k \cos^2 18^\circ \rightarrow k = -1$$



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$$A = \sqrt{r} \cos(\pi/10) \sin(\pi/5) - \sqrt{r} \sin(\pi/10) \cos(\pi/5) \quad \frac{\cos \pi/10 = -\frac{\sqrt{r}}{r}}{\sin \pi/10 = \frac{\sqrt{r}}{r}}$$

$$A = \sqrt{r} \left(-\frac{\sqrt{r}}{r}\right) \sin(\pi/5) - \sqrt{r} \left(\frac{\sqrt{r}}{r}\right) \cos(\pi/5) = -\frac{r}{r} (\cos \pi/5) - (\cos \pi/5) =$$

$$\frac{r}{r} \cos \pi/5 + \cos \pi/5 = 2 \cos \pi/5 \rightarrow \frac{A}{\cos \pi/5} = \frac{2 \cos \pi/5}{\cos \pi/5} = 2$$

$$f(x) = 14 \cos^2(\pi/4) \cos^2(\pi/4) \cos^2(\pi/4) \cos^2(\pi/4)$$

$$f\left(\frac{\pi}{4}\right) = 14 \cos^2\left(\frac{\pi}{4}\right) \cos^2\left(\frac{\pi}{4}\right) \cos^2\left(\frac{\pi}{4}\right) \cos^2\left(\frac{\pi}{4}\right) \quad \cos^2 \alpha = \frac{1 + \cos 2\alpha}{2}$$

$$f\left(\frac{\pi}{4}\right) = 14 \left(\frac{1 + \cos \pi/2}{2}\right) \left(\frac{1 + \cos \pi/2}{2}\right) \left(\frac{1 + \cos \pi/2}{2}\right) \left(\frac{1 + \cos \pi/2}{2}\right) = 14 \left(\frac{1 + 0}{2}\right) \left(\frac{1 + 0}{2}\right) \left(\frac{1 + 0}{2}\right) \left(\frac{1 + 0}{2}\right)$$

$$= \frac{4 + 4\sqrt{4}}{14}$$

$$\frac{1 - \sin \alpha}{1 + \sin \alpha} = \frac{r}{r} \rightarrow 1 - \sin \alpha = r + r \sin \alpha = -r = 0 \sin \alpha \rightarrow \sin \alpha = -\frac{r}{r}$$

$$\sin \alpha + \cos \alpha = 1 \rightarrow \cos \alpha = 1 - \sin \alpha = 1 - \left(-\frac{r}{r}\right) = \frac{2r}{r}$$

$$\sin \alpha = \frac{r \tan \alpha}{1 + \tan^2 \alpha} \rightarrow \sin \alpha = \frac{r \tan \frac{\alpha}{r}}{1 + \tan^2 \frac{\alpha}{r}} \quad \tan \frac{\alpha}{r} = t \rightarrow -\frac{r}{r} = \frac{r t}{1 + t^2}$$

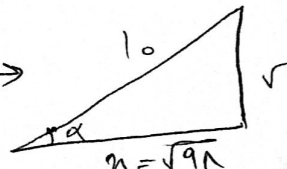
$$\rightarrow r t + r = -1 \cdot t \rightarrow r t + 1 \cdot t + r = 0 \rightarrow (r t + 1)(t + r) = 0 \rightarrow t = -\frac{1}{r} \times \cos \alpha$$

$$t = -r$$

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

$$= \frac{2 \sin \theta}{1 - \cos \theta} \quad \theta = 40^\circ \rightarrow \frac{2 \left(\frac{\sqrt{r}}{r}\right)}{1 - \left(\frac{1}{r}\right)} = \frac{\sqrt{r}}{\frac{1}{r}} = \frac{r \sqrt{r}}{1} = r \sqrt{r} = k \cot \frac{40^\circ}{r}$$

$$\rightarrow r \sqrt{r} = k \cot 40^\circ = k(\sqrt{r}) \rightarrow k = r$$

$$\sin \alpha = \frac{\sqrt{r}}{10} \rightarrow$$


$$\rightarrow (\sqrt{r})^2 + n^2 = 100 \rightarrow n = \sqrt{9r}$$

$$\Rightarrow \cos \alpha = \frac{\sqrt{9r}}{10} \rightarrow -\frac{\sqrt{9r}}{10}$$

$$\cos\left(\frac{11\pi}{2} + \alpha\right) = \cos \frac{11\pi}{2} \cos \alpha - \left(\sin \frac{11\pi}{2}\right) (\sin \alpha) = \left(-\frac{\sqrt{r}}{r}\right) \left(-\frac{\sqrt{9r}}{10}\right) - \left(\frac{\sqrt{r}}{r}\right) \left(\frac{\sqrt{r}}{10}\right)$$

$$= \frac{\sqrt{9r}}{r_0} - \frac{r}{r_0} = \frac{3r - r}{r_0} = \frac{2r}{r_0} = 2$$