

(18, 16)

تربانه طاهران - يازدهم دفتر - تالیف ۲۸

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

$$\Rightarrow |\sin \alpha| = \sin \alpha \Rightarrow \sin \alpha \geq 0$$

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

انتهای کاران α
 خاصیتی اول ابتدائی
 است

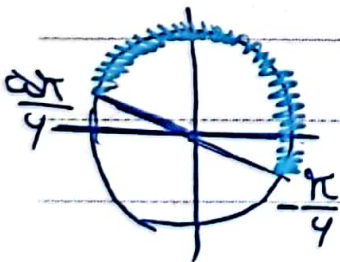
$$\Rightarrow \frac{1}{|\cos \alpha|} - \frac{\sin \alpha}{\cos \alpha} = \frac{1}{|\cos \alpha|} - \frac{\sin \alpha}{|\cos \alpha|}$$

$$\Rightarrow |\cos \alpha| = \cos \alpha \Rightarrow \cos \alpha \geq 0$$

$$-\frac{\pi}{4} < \alpha < \frac{\omega \pi}{4} \xrightarrow{x \cdot 2} -\frac{\pi}{2} < 2\alpha < \frac{\omega \pi}{2}$$

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(5)



$$\Rightarrow \frac{-1}{p} \leq \sin 2\alpha \leq 1 \Rightarrow \frac{-1}{p} \leq \frac{m-1}{k} \leq 1$$

$$\xrightarrow{x \cdot k} -k < m-1 \leq k$$

$$\Rightarrow m \in (-1, \omega]$$

$$-1 < m \leq \omega$$

$$\frac{\sin x}{\cos x} + \frac{\cos x}{\sin x} = \frac{\sin^2 x + \cos^2 x}{\sin x \cos x} = \dots$$

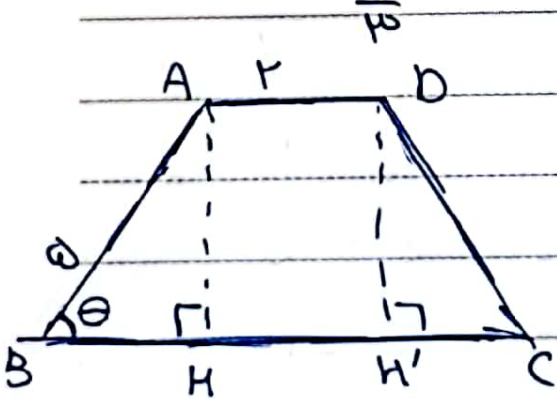
$$\frac{1}{\sin x \cos x} = \dots \Rightarrow \sin x \cos x = \frac{1}{\sqrt{10}} \quad (1, \sqrt{10})$$

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

$$= 1 + 2 \times \left(\frac{1}{\sqrt{10}}\right) = 1 + \frac{2}{\sqrt{10}} = \frac{1}{\sqrt{10}} \Rightarrow \sin x + \cos x = \frac{1}{\sqrt{10}}$$

$$\frac{\sin^2 x + \cos^2 x}{(\sin x + \cos x)^2} = \frac{1}{\left(\frac{1}{\sqrt{10}}\right)^2} \times (\sin^2 x + \cos^2 x - \sin x \cos x)$$

$$= \sqrt{10} \times \frac{1}{1 - \left(\frac{1}{\sqrt{10}}\right)} = \frac{\sqrt{10} \times \sqrt{10}}{\sqrt{10} - 1} = \frac{10\sqrt{10}}{\sqrt{10} - 1}$$



ارتفاع ذوزنق را می توانیم به این طریق بدست آوریم
 $\triangle ABH$

$$\cos \theta = \frac{BH}{AB} = \frac{BH}{k} = \frac{1}{\sqrt{10}}$$

$$\Rightarrow BH = \frac{k}{\sqrt{10}}, \quad AH = l$$

$$S_{ABCD} = S_{ABH} + S_{DCH'} + S_{ADH'H} = l + l = 2l$$

$$2 \times S_{ABH} = 2 \times \frac{1}{2} \times \frac{k}{\sqrt{10}} \times l = l \times \frac{k}{\sqrt{10}} = l \times \frac{1}{\sqrt{10}} = l$$

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$$\begin{aligned} & \tan\left(\frac{w\pi}{p} + 1a\right) \tan(1a - \pi) - \sin(1a) \cos\left(\frac{w\pi}{p} - 1a\right) \\ &= (-\cot 1a) \times \tan 1a - \sin 1a \times (-\sin 1a) \\ &= -1 + \sin^2 1a = -\cos^2 1a \Rightarrow k = -1 \end{aligned}$$

$$\begin{aligned} & \sqrt{w} \cos(\pi) \times \sin\left(\frac{w\pi}{p} - \pi\right) - \sqrt{p} \sin(1a) \cos(\pi - \pi) \\ &= \sqrt{w} \times \frac{-\sqrt{w}}{p} \times (-\cos \pi) - \sqrt{p} \times \frac{\sqrt{p}}{p} \times (-\cos \pi) \\ & \frac{w}{p} \cos \pi + \cos \pi = \frac{p}{p} \cos \pi \end{aligned}$$

$$f\left(\frac{\pi}{14}\right) = 14 \cos^2\left(\frac{\pi}{14}\right) \times \cos^2\left(\frac{\pi}{7}\right) \times \cos^2\left(\frac{\pi}{2}\right)$$

$$\times \cos^2\left(\frac{\pi}{10}\right) = 14 \times \frac{w}{k} \times \frac{1}{k} \times \frac{1}{k} \times \cos^2\left(\frac{\pi}{14}\right)$$

$$= \frac{w}{k} \cos^2\left(\frac{\pi}{14}\right) = \frac{w}{k} \times \frac{\sqrt{w+p}}{k} = \frac{w\sqrt{w+p}}{14}$$

$$\cos 2\alpha = \cos^2 \alpha - \sin^2 \alpha \Rightarrow \cos \frac{\pi}{7} = \cos^2 \frac{\pi}{14} - \sin^2 \frac{\pi}{14}$$

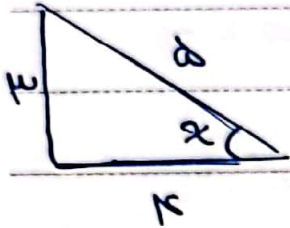
$$\begin{aligned} &= \frac{\sqrt{3}}{2} \Rightarrow \begin{cases} \cos^2 \frac{\pi}{14} - \sin^2 \frac{\pi}{14} = \frac{\sqrt{3}}{2} \\ \cos^2 \frac{\pi}{14} + \sin^2 \frac{\pi}{14} = 1 \end{cases} \end{aligned}$$

$$k \cos^2 \frac{\pi}{14} = \frac{w\sqrt{w+p}}{14} \Rightarrow \cos^2 \frac{\pi}{14} = \frac{\sqrt{w+p}}{k}$$

$$\frac{1 - \sin x}{1 + \sin x} = k \Rightarrow k + k \sin x = 1 - \sin x \quad - \Delta$$

$$\Rightarrow 2 \sin x = -k$$

$$\Rightarrow \sin x = -\frac{k}{2} \quad \text{⑤}$$



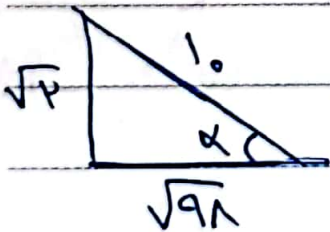
$$\Rightarrow \cos x = \frac{p}{r}$$

$$\tan x = \frac{\sin x}{1 + \cos x} = \frac{-\frac{k}{2}}{1 + \frac{p}{r}} = \frac{-\frac{k}{2}}{\frac{r+p}{r}} = \frac{-\frac{k}{2} \cdot r}{r+p} = \boxed{-\frac{kr}{2(r+p)}}$$

$$\frac{\sin x}{1 + \cos x} = \frac{1 - \cos x}{\sin x} = \tan \frac{x}{2} \quad \Delta$$

$$\frac{\sin \theta}{1 - \cos \theta} + \frac{1 + \cos \theta}{\sin \theta} = \cot \frac{\theta}{2} + \cot \frac{\theta}{2} \quad \text{⑥}$$

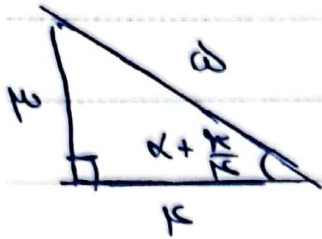
$$= 2 \cot \frac{\theta}{2} \Rightarrow k = \boxed{2r}$$



$$\sin \alpha = \frac{\sqrt{p}}{1} \quad \cos \alpha = \frac{-\sqrt{q}}{1} \quad \text{⑦}$$

$$\sqrt{p} \sin \left(\alpha + \frac{\pi}{k} \right) = \sin \alpha + \cos \alpha =$$

$$\Rightarrow \sin \left(\alpha + \frac{\pi}{k} \right) = \frac{-\sqrt{q}}{\sqrt{p}} = \frac{\sqrt{p} - \sqrt{q}}{1} = \frac{p - q}{p + q}$$



$$\Rightarrow \cos\left(\alpha + \frac{\pi}{k}\right) = -\frac{r}{B}$$

$$|\sin \alpha| < |\cos \alpha| \Rightarrow \frac{\pi}{k} < \alpha < \pi$$

$$\Rightarrow \pi < \alpha + \frac{\pi}{k} < \frac{2\pi}{k} \Rightarrow \cos\left(\alpha + \frac{\pi}{k}\right) < 0$$

$$\begin{aligned} \cos\left(\frac{11\pi}{k} + \alpha\right) &= \cos\left(\pi - \left(\frac{\pi}{k} + \alpha\right)\right) = -\cos\left(\alpha + \frac{\pi}{k}\right) \\ &= +\frac{r}{B} \end{aligned}$$

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

$$\rightarrow \frac{-\sqrt{r}}{r} (\cos \alpha + \sin \alpha) \quad \cos \alpha = \frac{-\sqrt{r}}{1}$$

$$\hookrightarrow \frac{-\sqrt{r}}{r} \left(\frac{-\sqrt{r}}{1} + \frac{\sqrt{r}}{1}\right) = \frac{r}{r}$$