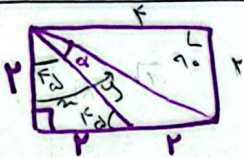


$$\frac{1}{r} \times r \times \sqrt{r} \times \sin \alpha = r/d \Rightarrow \sin \alpha = \frac{r}{r\sqrt{r}} = \frac{\sqrt{r}}{r}$$

$$\sin \alpha = \frac{\sqrt{r}}{r} \Rightarrow \alpha = \frac{\pi}{4} \Rightarrow \frac{a_{\max}}{a_{\min}} = \frac{r\pi}{\frac{\pi}{r}} = r$$

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$$\Rightarrow \cot \alpha = \frac{r}{r}$$

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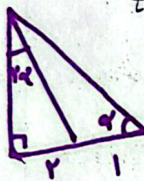
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$$\tan \alpha = \tan(y-x) \Rightarrow \tan \alpha = \frac{\tan y - \tan x}{1 + \tan x \tan y} = \frac{r-1}{1+r} = \frac{1}{r}$$

$$\tan 2\alpha = \tan(\alpha + \alpha) = \frac{\tan \alpha + \tan \alpha}{1 - \tan^2 \alpha} = \frac{r \tan \alpha}{1 - \tan^2 \alpha}$$

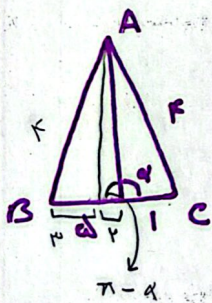
$$\Rightarrow \tan \alpha = \frac{r}{r} \Rightarrow \tan 2\alpha = \frac{r}{1 - \frac{r^2}{r}} = \frac{r^2}{r - r^2} = \frac{r}{1 - r}$$

$$\Rightarrow \tan \alpha = \frac{r}{1 - r} = \frac{1}{r} \Rightarrow \cot \alpha = r$$



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 $\sqrt{33}$
 $\frac{r}{1+r}$
 $\frac{r}{1-r}$
 $\sqrt{33}$

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$$AB^2 = AH^2 + BH^2 \Rightarrow 1^2 = AH^2 + r^2 \Rightarrow AH^2 = 1 - r^2 \Rightarrow AH = \sqrt{1 - r^2}$$

$$\tan(x-\alpha) = \frac{\sqrt{1-r^2}}{r} \Rightarrow -\tan \alpha = \frac{\sqrt{1-r^2}}{r} \Rightarrow \tan \alpha = -\frac{\sqrt{1-r^2}}{r}$$

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$$r \sin^2 \alpha + \cos^2 \alpha = \frac{r}{r} \Rightarrow \sin^2 \alpha + \sin^2 \alpha + \cos^2 \alpha = \frac{r}{r} \Rightarrow \sin^2 \alpha = \frac{1}{r}$$

$$\tan^2 \alpha = ? \rightarrow \frac{\sin^2 \alpha}{\cos^2 \alpha} = \frac{\sin^2 \alpha}{1 - \sin^2 \alpha} = \frac{\frac{1}{r}}{\frac{r-1}{r}} = \frac{1}{r-1}$$

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$$\frac{\sin^2 \alpha + r \cos^2 \alpha}{1 - \sin^2 \alpha} - \frac{\cos^2 \alpha + r \sin^2 \alpha}{1 - \cos^2 \alpha}$$

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

$$\Rightarrow (r - \sin^2 \alpha) - (r - \cos^2 \alpha) = \cos^2 \alpha - \sin^2 \alpha = \cos(2\alpha)$$

$$\sin\left(\frac{9\pi}{r} + \alpha\right) \cos\left(\frac{v\pi}{r} - \alpha\right) - \tan\left(\alpha - \frac{r\pi}{r}\right)$$

$$\downarrow \sin\left(\frac{r\pi}{r} + \alpha\right) \cos\left(\frac{r\pi}{r} - \alpha\right) + \tan\left(\frac{r\pi}{r} - \alpha\right)$$

① $\cos(\alpha)(-\sin(\alpha)) + \cot(\alpha) \xrightarrow{\tan \alpha = \frac{r}{\omega}} \cos \alpha = -\frac{r}{\omega}, \sin \alpha = -\frac{r}{\omega}, \cot \alpha = \frac{r}{r}$

$$\Rightarrow \left(-\frac{r}{\omega}\right)\left(-\frac{r}{\omega}\right) + \frac{r}{r} = \frac{r^2}{\omega^2} + \frac{r}{r} = \frac{r^2}{\omega^2} + 1 = \frac{r^2 + \omega^2}{\omega^2}$$

$$\left(\frac{r \cos \frac{\pi}{11} + \sqrt{r} \sin \frac{\pi}{11}}{\frac{\pi}{11}} - \sqrt{r} \cos \frac{\pi}{11}\right) \Rightarrow \frac{r}{\frac{\pi}{11}} + \sqrt{r} \left(\sin \frac{\pi}{11} - \cos \frac{\pi}{11}\right)$$

$$x = \frac{\pi}{11}$$

$$\hookrightarrow \sin \frac{\pi}{11} < \cos \frac{\pi}{11}$$

$$\hookrightarrow A < 0$$

$$\Rightarrow A^2 = \left(\sin \frac{\pi}{11} - \cos \frac{\pi}{11}\right)^2 = \sin^2 \frac{\pi}{11} + \cos^2 \frac{\pi}{11} - 2 \sin \frac{\pi}{11} \cos \frac{\pi}{11}$$

$$A^2 = 1 - \sin \frac{\pi}{7} = 1 - \frac{1}{r} = \frac{r-1}{r} \xrightarrow{A < 0} A = -\frac{1}{\sqrt{r}} \Rightarrow \frac{r}{r} + \sqrt{r} \left(-\frac{1}{\sqrt{r}}\right) = \frac{r}{r} - 1 = \frac{r-1}{r}$$

$$\tan\left(\frac{\alpha}{r}\right) = \frac{1}{r} \rightarrow \tan \alpha = \frac{r \tan \frac{\alpha}{r}}{1 - \tan^2 \frac{\alpha}{r}} = \frac{r \left(\frac{1}{r}\right)}{1 - \frac{1}{r^2}} = \frac{1}{\frac{r^2-1}{r^2}} = \frac{r^2}{r^2-1} = \frac{r}{r-1}$$

$$\frac{\tan \alpha - \sin \alpha}{\sin \alpha - \cos \alpha}$$

$$\hookrightarrow \sin \alpha = \frac{r}{11}, \cos \alpha = \frac{10}{11}$$

$$\hookrightarrow \frac{\frac{r}{10} - \frac{r}{11}}{\frac{r}{11} - \frac{10}{11}} = \frac{r(11-10)}{11 \times 10} = \frac{r}{110}$$

$$\frac{\frac{r}{11} - \frac{10}{11}}{-\frac{r}{11}} = \frac{r-10}{-r} = \frac{10-r}{r}$$

$$r \sin \alpha < \sin r \alpha \Rightarrow r \sin \alpha < r \sin \alpha \cos \alpha$$

$$\frac{\cot \alpha}{\sin \alpha} > 0$$

$$\hookrightarrow r \sin \alpha - r \sin \alpha \cos \alpha < 0 \Rightarrow r \sin \alpha (1 - \cos \alpha) < 0$$

$$\Rightarrow \sin \alpha < 0 \Rightarrow \text{Ⓡ}$$

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