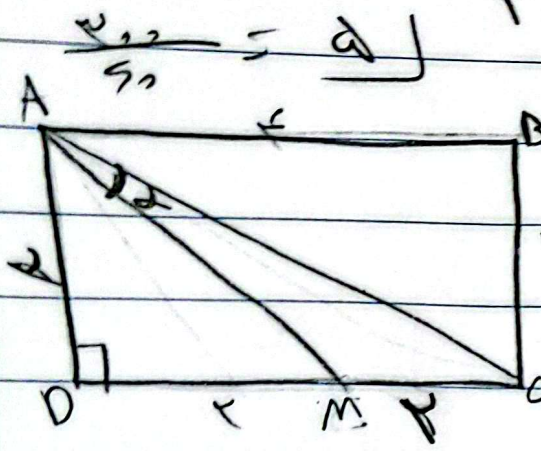


$$\frac{1}{2} \times \sqrt{3} \times 9 \times \sin \alpha = \frac{9}{2} \quad (1)$$

$$\rightarrow 3\sqrt{3} \sin \alpha = \frac{9}{1} \Rightarrow \sin \alpha = \frac{\sqrt{3}}{3} \quad \left\{ \begin{array}{l} \min \leq 9 \\ \max \leq 30 \end{array} \right.$$



$$AM = \sqrt{3^2 + 3^2} = 3\sqrt{2}$$

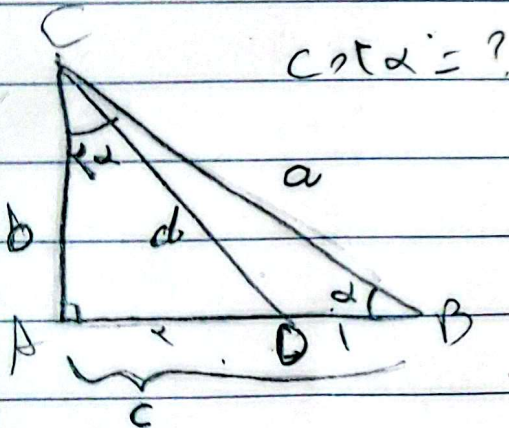
$$AC = \sqrt{3^2 + 9^2} = \sqrt{90} = 3\sqrt{10}$$

$$\cos \alpha = \frac{3}{3\sqrt{10}} = \frac{1}{\sqrt{10}}$$

$$\cot \alpha = \frac{\cos \alpha}{\sin \alpha} = \frac{\frac{1}{\sqrt{10}}}{\frac{\sqrt{3}}{3}} = \frac{3}{\sqrt{30}} = \frac{\sqrt{30}}{10}$$

S_{AMCE} مستطیل - مساحت = $1 - (3+3) = 1$

$$1 = \frac{1}{2} \times 3\sqrt{2} \times 3\sqrt{10} \times \sin \alpha \Rightarrow \sin \alpha = \frac{1}{\sqrt{10}}$$



$\cot \alpha = ?$

$$\cos^2 \alpha = \cos^2 \alpha - \sin^2 \alpha = \frac{b}{d} = \left(\frac{a}{b}\right)^2 - \left(\frac{b}{a}\right)^2 \Rightarrow \frac{a-b^2}{a^2}$$

$$\sin^2 \alpha = 2 \sin \alpha \cos \alpha$$

$$\hookrightarrow \frac{1}{d} = 2 \left(\frac{b}{a}\right) \left(\frac{a}{b}\right) = \frac{2a}{b} \Rightarrow a^2 = 2ad$$

$$\rightarrow \frac{a-b^2}{a^2} = \frac{a-b^2}{2ad} = \frac{b}{d} \Rightarrow b = \frac{a}{2}$$

$$\cot \alpha = \frac{a}{b} = \frac{2a}{a} = 2$$

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

$$\tan^2 \alpha = ?$$

(d)

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

$$r - r \cos^2 \alpha + \cos^2 \alpha = \frac{r}{r} \quad \cdot \quad r - \cos^2 \alpha = \frac{r}{r}$$

$$\cos^2 \alpha = \frac{r}{r}$$

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

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

(e)

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

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

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

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

$$= \cos^2 \alpha$$

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

(v)

$$\Rightarrow \cos^2 \alpha = \frac{r}{r} \rightarrow \cos \alpha = \frac{r}{r}$$

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

$$= (+\cos \alpha)(-\cos \alpha) + \cot \alpha$$

$$= \frac{-1}{r} + \frac{r}{r} = \frac{-r}{r}$$

POODLE

$$n = \frac{\pi}{f}$$

(1)

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

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

$$= r \cos \left(\frac{\pi}{f} \right) + r \sin \left(\frac{\pi}{f} - \frac{\pi}{f} \right) \quad n = \frac{\pi}{f}$$

$$= r \cos \frac{\pi}{f} + r \sin \left(\frac{\pi}{f} - \frac{\pi}{f} \right) = r \cos \frac{\pi}{f} + r \sin \left(-\frac{\pi}{f} \right) = \frac{1}{f}$$

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

$$\tan \frac{\alpha}{f} = \frac{1}{f}$$

(2)

$$\sin \alpha = \frac{r \tan \frac{\alpha}{f}}{1 + \tan^2 \frac{\alpha}{f}} = \frac{r \left(\frac{1}{f} \right)}{1 + \frac{1}{f^2}} = \frac{\frac{1}{f}}{\frac{f^2 + 1}{f^2}} = \frac{1}{f} \cdot \frac{f^2}{f^2 + 1} = \frac{f}{f^2 + 1}$$

$$\cos \alpha = \frac{1 - \tan^2 \frac{\alpha}{f}}{1 + \tan^2 \frac{\alpha}{f}} = \frac{1 - \frac{1}{f^2}}{1 + \frac{1}{f^2}} = \frac{\frac{f^2 - 1}{f^2}}{\frac{f^2 + 1}{f^2}} = \frac{f^2 - 1}{f^2 + 1}$$

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

$$\Rightarrow \frac{\frac{f}{f^2 + 1} - \frac{f^2 - 1}{f^2 + 1}}{\frac{f}{f^2 + 1} - \frac{f^2 - 1}{f^2 + 1}} = \frac{-1}{10}$$

(3)

$$r \sin \alpha < \sin^2 \alpha \rightarrow r \sin \alpha < r \sin \alpha \cos \alpha$$

$$\rightarrow r \sin \alpha - r \sin \alpha \cos \alpha < 0$$

$$\rightarrow r \sin \alpha (1 - \cos \alpha) < 0 \Rightarrow \sin \alpha < 0 \quad (\star)$$

$$\frac{\cos \alpha}{\sin \alpha} > 0 \rightarrow \frac{\cos \alpha}{\sin \alpha} > 0 \rightarrow \cos \alpha > 0 \quad (\star)$$

$$(\star), (\star) \Rightarrow \mu < 0$$

