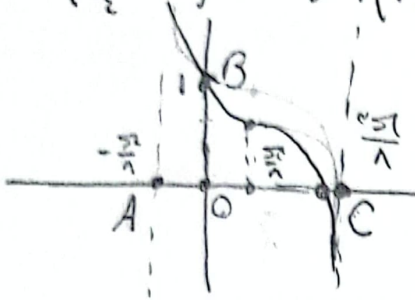


$$\tan\left(\frac{\pi}{2} - \nu\right) = -\tan\left(\nu - \frac{\pi}{2}\right) \quad T = \frac{\pi}{\nu}$$



$$AC = \frac{\pi}{\nu} \quad B = f(0) = \tan \frac{\pi}{2} = 1$$

$$\Rightarrow S_{ABC} = \frac{AC \cdot BO}{2} = \frac{\frac{\pi}{\nu} \times 1 \times \frac{1}{\nu}}{2} = \frac{\pi}{2\nu^2}$$

۱

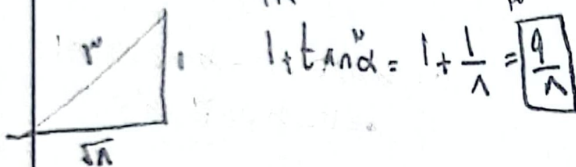
$$\frac{\pi}{9} - \frac{\nu}{\pi} \sin \alpha - \frac{1}{\pi} \cos \alpha = 0$$

$$\Rightarrow \frac{\pi}{9} - \frac{\nu}{\pi} \sin \alpha - \frac{1}{\pi} (1 - \sin^2 \alpha) = 0$$

$$\sin \alpha = \frac{\nu \pi \pm 1}{\pi} \Rightarrow \sin \alpha = \frac{1}{\pi}$$

$$\hookrightarrow 14 - \nu \pi \sin \alpha - 9(1 - \sin^2 \alpha) = 9 \sin^2 \alpha - \nu \pi \sin \alpha + \nu$$

۲



$$1 + \tan \alpha = 1 + \frac{1}{\pi} = \frac{q}{\pi}$$

$$\log \frac{\sin \alpha}{\cos \alpha} = \log \nu \Rightarrow -\tan \alpha = \nu \Rightarrow \tan \alpha = -\nu$$

$$\sin \alpha > 0 \quad \cos \alpha < 0$$



$$\Rightarrow \begin{cases} \cos \alpha = -\frac{1}{\sqrt{10}} \\ \sin \alpha = \frac{\nu}{\sqrt{10}} \end{cases} \Rightarrow \sin \alpha - \cos \alpha = \frac{\pi}{\sqrt{10}} = \frac{\nu \sqrt{10}}{\omega}$$

۳

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

صورت
مخرج

$$\sin \alpha \tan \alpha - \frac{1}{\cos \alpha} = \frac{\sin^2 \alpha - 1}{\cos \alpha} \Rightarrow \cos \alpha < 0 \quad (4)$$

$$(1), (2) \Rightarrow \frac{\pi}{2} \alpha \approx \frac{\pi}{2}$$

در نهایت

۵

$$\sin^2 \alpha + 1 - \sin^2 \alpha = \frac{\pi}{\omega} \Rightarrow \sin^2 \alpha - \sin^2 \alpha = -\frac{1}{\omega}$$

$$\begin{cases} \cos^2 \alpha + \sin^2 \alpha + \nu \sin^2 \alpha \cos \alpha = 1 \\ 1 \cdot \sin^2 \alpha - \nu \sin^2 \alpha \end{cases} \Rightarrow \cos^2 \alpha = \sin^2 \alpha - \nu \sin^2 \alpha \Rightarrow \cos^2 \alpha + \sin^2 \alpha = \sin^2 \alpha - \nu \sin^2 \alpha$$

$$= -\frac{1}{\omega}$$

۶

$$r \cos x + p \sin x = -1 \quad p \sin x = -r \cos x \Rightarrow \frac{\sin x}{\cos x} = -\frac{r}{p} = \tan x \Rightarrow \cot x = -\frac{p}{r}$$

$$\Rightarrow -\frac{r}{p} = \frac{p}{r} = -\frac{8-9}{4} = -\frac{1p}{4}$$

8

$$\frac{1 + \sin \theta}{\sin \theta + \sin \theta} = \frac{\sin \theta \cos \theta}{\sin(\theta + \pi) + \sin(\theta + \pi)} \cdot \frac{\sin \theta \cos \theta}{\sin \theta \cos \theta + \cos \theta \sin \theta + \sin \theta \cos \theta - \cos \theta \sin \theta}$$

$$= \frac{\sin \theta + \cos \theta}{\frac{1}{r} \sin \theta \cos \theta} = \frac{\sqrt{r} \sin(\theta + \theta)}{\cos \theta} = \frac{\sqrt{r} \sin \theta}{\cos \theta} = \boxed{\sqrt{r}}$$

9

$$(\cos \theta) (\cos \phi) (\cos \epsilon) = \frac{\sin \theta (\cos \theta) (\cos \phi) (\cos \epsilon)}{\sin \theta} = \frac{\sin \theta}{\sin \theta} = \boxed{\frac{1}{\lambda} \cos \theta}$$

$$1 - r \sin^2 \theta = \cos \theta$$

$$r \cos^2 \theta = 1 - \cos \theta$$

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

10

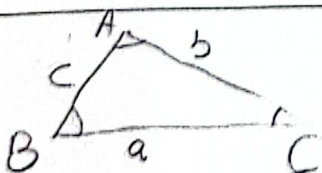
$$\omega (r \cos^2 \alpha - 1) - 1 r \cos \alpha = 1 \cdot \cos^2 \alpha - 1 r \cos \alpha - \omega$$

$$(\sin \alpha)^2 = (r \cdot r \cos \alpha)^2 \Rightarrow \sin^2 \alpha = \epsilon - 1 r \cos \alpha + 9 \cos^2 \alpha$$

$$1 - \cos^2 \alpha = 1 - \cos^2 \alpha + 1 r \cos \alpha - 1 r \cos \alpha = 0$$

$$\Rightarrow 1 - \cos^2 \alpha - 1 r \cos \alpha - \omega = \boxed{-1}$$

11



$$\cos \frac{A}{2} = \frac{1 + \cos A}{2} \Rightarrow \cos A = \cos (\pi - (B+C)) = -\cos (B+C)$$

$$1 - \cos (B+C) = r \sin B \sin C$$

$$\Rightarrow 1 - (\cos B \cos C - \sin B \sin C) = r \sin B \sin C$$

$$1 - (\cos B \cos C + \sin B \sin C) = 0 \Rightarrow 1 - \cos (B-C) = 0 \Rightarrow \cos (B-C) = 1$$

$$\Rightarrow B-C = 0$$

$$\Rightarrow B = C, C = B \Rightarrow A = \pi$$

12