

مسئله ۱

①

$$T = \frac{\pi}{|a|} \Rightarrow \frac{\pi}{p} \Rightarrow AC = \frac{\pi}{p}$$

$$\Rightarrow x = 0 \Rightarrow y = \tan\left(\frac{\pi}{p}\right) \Rightarrow B = 1$$

$$\Rightarrow \hat{ABC} = 1 \times \frac{\pi}{p} \times \frac{1}{p} = \frac{\pi}{p}$$

$$S = \sin \alpha \Rightarrow x_p = \sin \alpha - \frac{p}{p} \xrightarrow{\text{مشتق}} 4 \sin^2 \alpha - p \sin \alpha + p = 0$$

$$P = -\frac{1}{p} \cos^2 \alpha$$

$$\Rightarrow \sin \alpha = \frac{ps \pm 1}{1} \Rightarrow \cos^2 \alpha = \frac{1}{p} \Rightarrow 1 + \frac{1}{p} = \frac{p}{1} = \frac{p}{1}$$

$$\frac{\sin \alpha}{-\cos \alpha} = 1^p \Rightarrow \tan \alpha = -1^p \Rightarrow \left. \begin{matrix} \sin \alpha > 0 \\ -\cos \alpha > 0 \end{matrix} \right\} \Rightarrow \text{دوم}$$

$$\Rightarrow \frac{p}{\sqrt{10}} - \left(-\frac{1}{\sqrt{10}}\right) = \frac{p}{\sqrt{10}} + \frac{1}{\sqrt{10}} = \frac{p+1}{\sqrt{10}} = 0.5\sqrt{10}$$

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

$$\rightarrow 1 - 2 \cos^2 \theta + \cos^2 \theta + \cos^2 \theta = \frac{p}{q} \rightarrow \cos^2 \theta - \cos^2 \theta = -\frac{1}{q}$$

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

$$\frac{\sin x (1 + \cos x)}{1 + \sin^2 x} < 0 \Rightarrow \frac{1 + \cos x}{1 + \sin^2 x} < 0 \Rightarrow \sin x < 0 \rightarrow \text{سوم یا چهارم} \text{ (I)}$$

$$\frac{\sin^2 x - 1}{\cos x} > 0 \Rightarrow \frac{-\cos^2 x}{\cos x} > 0 \Rightarrow \cos x < 0 \Rightarrow \text{دوم یا سوم} \text{ (II)}$$

$$\text{(I) } \cap \text{ (II)} \Rightarrow \text{سوم}$$

$$p \cos x = -w \sin x \rightarrow \tan x = -\frac{p}{w} \Rightarrow \cot x = -\frac{w}{p}$$

$$\Rightarrow \tan x + \cot x = -\frac{p}{w} - \frac{w}{p} = \boxed{-\frac{p^2 + w^2}{pw}}$$

$$\underbrace{(1 - p \sin \theta_0)}_{\cos \theta_0} \underbrace{(p \cos \theta_0 - 1)}_{\cos \theta_0} \underbrace{\left( \frac{1 - \tan \theta_0}{1 + \tan \theta_0} \right)}_{\cos \theta_0} = \cos \theta_0 \times \cos \theta_0 \times \cos \theta_0$$

$$\Rightarrow \frac{\sin \theta_0 \cos \theta_0 \cos \theta_0 \cos \theta_0}{\sin \theta_0} = \frac{1 \times \sin \theta_0 \times \cos \theta_0}{p \times \sin \theta_0} = \frac{1}{p} \times \frac{\cos \theta_0}{\sin \theta_0} = \boxed{\frac{1}{p} \cot \theta_0}$$