

$$A(\cos(\frac{\pi}{4}-\alpha), \sin(\frac{\pi}{4}-\alpha)) \Rightarrow A(\sin\alpha, \cos\alpha)$$

$$B(1, \tan(\frac{\pi}{4}-\alpha)) \Rightarrow B(1, \cot\alpha)$$

$$\overline{AB} = \sqrt{(\sin\alpha-1)^2 + (\cos\alpha-\cot\alpha)^2} = \sqrt{(\sin\alpha-1)^2 + \left(\frac{\cos\alpha(1-\sin\alpha)}{\sin\alpha}\right)^2} = \sqrt{(\sin\alpha-1)^2 \left(1 + \frac{\cos^2\alpha}{\sin^2\alpha}\right)} = \sqrt{(\sin\alpha-1)^2 \frac{1+\cos^2\alpha}{\sin^2\alpha}} = \frac{|\sin\alpha-1|}{\sin\alpha} \sqrt{1+\cos^2\alpha}$$

$$\text{در مثل ADC: } \frac{4}{\frac{1}{\sqrt{2}}} = \frac{AC}{\sin\alpha} \Rightarrow AC = 4\sin\alpha$$

$$\Rightarrow \frac{AB}{AC} = \frac{4\sqrt{2}\sin\alpha}{4\sin\alpha} = \sqrt{2}$$

$$\text{ADB مثل: } \frac{4}{\frac{\sqrt{2}}{2}} = \frac{AB}{\sin(\frac{\pi}{4}-\alpha)} \Rightarrow AB = 4\sqrt{2}\sin\alpha$$

$$A(\frac{1}{\sqrt{2}}, \frac{\sqrt{2}}{2}), B(-\frac{\sqrt{2}}{2}, \frac{1}{\sqrt{2}}), C(0, -1)$$

- با توجه به داده های سوال:

$$S_{ABC} = S_{ABO} + S_{BOC} + S_{AOC} = \frac{1}{2} \left(\sin\frac{\pi}{4} + \sin\frac{\pi}{4} + \sin\frac{\pi}{2} \right)$$

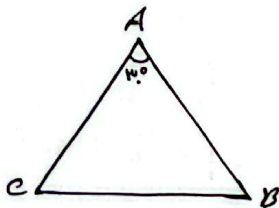
$$\cos A = \frac{1}{\sqrt{2}} \xrightarrow{\text{در } \triangle A} A = \frac{\pi}{4}$$

$$\sin B = \frac{1}{\sqrt{2}} \xrightarrow{\text{در } \triangle B} B = \frac{\pi}{4}$$

$$\Rightarrow S_{ABC} = \frac{1}{2} \left(\frac{1}{\sqrt{2}} + \frac{1}{\sqrt{2}} + 1 \right) = \frac{1+\sqrt{2}}{2}$$

$$\frac{\pi}{4} \leftarrow \text{نقطه } C \text{ نیز با توجه به شکل}$$

$$\text{ب) } P_{ABC} = \overline{AB} + \overline{BC} + \overline{AC} \Rightarrow \begin{cases} \overline{AB} = \sqrt{(\frac{1}{\sqrt{2}} + \frac{\sqrt{2}}{2})^2 + (\frac{\sqrt{2}}{2} - \frac{1}{\sqrt{2}})^2} = \sqrt{2} \\ \overline{BC} = \sqrt{(-\frac{\sqrt{2}}{2})^2 + (\frac{1}{\sqrt{2}} + 1)^2} = \sqrt{2} \\ \overline{AC} = \sqrt{(\frac{1}{\sqrt{2}})^2 + (\frac{\sqrt{2}}{2} + 1)^2} = \sqrt{2+\sqrt{2}} \end{cases} \Rightarrow P_{ABC} = \sqrt{2} + \sqrt{2} + \sqrt{2+\sqrt{2}}$$



$$S = \frac{1}{2} \times AC \times AB \times \sin A$$

$$x - \cos\alpha = 0 \Rightarrow x = \cos\alpha \Rightarrow f(\cos\alpha) = 1$$

$$\Rightarrow \cos^2\alpha - \cos^2\alpha - \sin^2\alpha(\cos^2\alpha - 1) = 1 \Rightarrow \cos^2\alpha(\cos^2\alpha + \sin^2\alpha) = 1$$

$$\cos^2\alpha(\cos^2\alpha - 1)$$

$$\Rightarrow \cos^2\alpha = 1$$

$$\sin^2\alpha = 1 - \cos^2\alpha = 0 \Rightarrow \sin^2\alpha = 0$$

$$y = -2 \sin \alpha \cos \alpha + 2 \quad [-\pi, \pi]$$

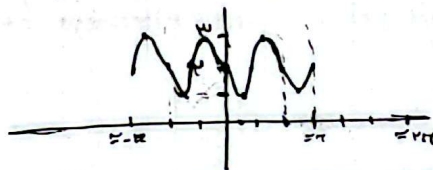
$$- \sin 2\alpha + 2$$

$$T = \pi$$

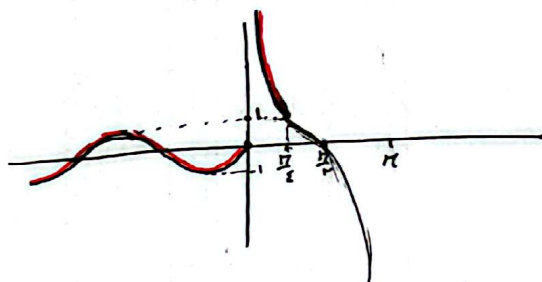


$$\Rightarrow y = 2 \cos(\pi x + \frac{\pi}{2}) + 1$$

$$\Rightarrow y = -2 \sin \pi x + 1 \rightarrow T = 2$$



$$f(x) = \begin{cases} ax & ; -\infty < x < \frac{\pi}{\varepsilon} \\ \sin x & ; x \leq 0 \end{cases}$$



$$\Rightarrow R_f = [-1, +\infty)$$

$$f(x) = b \sin(cx) \cos(cx) \cos(\pi x) + a \Rightarrow f(x) = \frac{b}{\pi} \sin(\pi x) + a$$

$$\begin{cases} \frac{|b|}{\pi} + a = \pi \\ -\frac{|b|}{\pi} + a = 0 \end{cases}$$

$$\pi a = \pi \Rightarrow a = 1, |b| = \pi$$

$$T = \frac{\pi}{\pi} - \frac{\pi}{\pi} = \frac{\pi}{\omega} = \frac{\pi}{|\pi c|} \Rightarrow |c| = \frac{\omega}{\pi} \xrightarrow{c>0} \frac{\omega}{\pi} = c$$

$$b = \pi : (\pi, \pi) \text{ نقطة } \sin \text{ و } \cos \text{ : } \leftarrow$$

$$\frac{bc}{a} = \frac{\pi \times \frac{\omega}{\pi}}{1} = \boxed{\omega}$$

$$T = \pi = \frac{\pi \pi}{|b|} \Rightarrow |b| = \pi \Rightarrow b = \pi$$

$$f(x) = -\pi \cos \pi x - 1$$

$$-\pi \cos \pi x - 1 = 0 \Rightarrow \cos \pi x = -\frac{1}{\pi}$$

$$\begin{cases} |a| + c = \pi \\ -|a| + c = -\pi \end{cases}$$

$$\cos \pi x = \frac{1 - \tan^2 \alpha}{1 + \tan^2 \alpha} \Rightarrow -\frac{1}{\pi} = \frac{1 - \tan^2 \alpha}{1 + \tan^2 \alpha} = 1 - \tan^2 \alpha$$

$$c = -1, |a| = \pi \rightarrow \{ \text{نقطة } \sin \}$$

$$\Rightarrow a = -\pi$$

$$\left| \tan \alpha \right| = \left| \frac{\pi \tan \alpha}{1 - \tan^2 \alpha} \right|$$

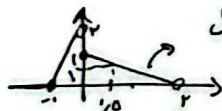
$$\frac{\pi}{\omega} \tan^2 \alpha = \frac{\pi}{\pi} \Rightarrow \tan^2 \alpha = \pm \sqrt{\pi}$$

$$T = \pi \Rightarrow f(x) = f(x + \pi) \rightarrow -\pi \cos \pi(x + \pi) - 1 \in [-1, \pi] \Rightarrow -1 \leq -\pi \cos \pi(x + \pi) - 1 \leq \pi$$

$$\Rightarrow \pi, 0 \leq \pi n < \pi, \omega \Rightarrow \frac{\pi \omega}{\pi} \leq n < \frac{\pi \omega}{\pi} \Rightarrow n = 1 \pi \rightarrow \alpha' = -\pi \cos \pi(x + \pi) - 1 = 1, \omega$$

$$\Rightarrow f(\pi \omega) = f(-\pi \omega)$$

$\rightarrow$



$$y = -\frac{1}{\pi} x + 1 \Rightarrow f(\pi \omega) = -\frac{1}{\pi} \times \frac{\pi}{\pi} + 1 = \boxed{\frac{1}{\pi}}$$