

$$\tan\left(\frac{\pi}{4} - \alpha\right) = \cot \alpha$$

$$OB = \sqrt{1 + \cot^2 \alpha} = \frac{1}{\sin \alpha} \quad OA = 1 \rightarrow -OA \rightarrow OB - OA = \frac{1}{\sin \alpha} - 1$$

$$\Rightarrow AB = \frac{1}{\sin \alpha} - 1 \quad \checkmark$$

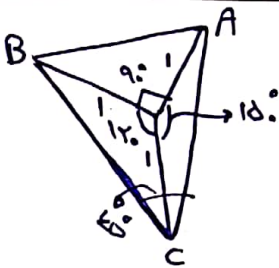
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$$\left. \begin{array}{l} \frac{AC}{\sin \alpha} = \frac{r}{\sin \frac{\pi}{4}} \\ \frac{AB}{\sin(\frac{\pi}{4} - \alpha)} = \frac{r}{\sin \alpha} \end{array} \right\} \xrightarrow{\odot} \frac{AC}{AB} = \frac{\frac{r \times r}{1}}{r \times \frac{1}{\sqrt{2}}} = \frac{1}{\sqrt{2}} \Rightarrow \frac{AB}{AC} = \sqrt{2} \quad \checkmark$$

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$$\xrightarrow{\text{قضیه سینوس}} BC = \sqrt{3}, AC = \sqrt{2 + \sqrt{3}}, \xrightarrow{\text{قضیه سینوس}} AB = \sqrt{2} \quad (1,5)$$

$$S = \frac{1}{2} BC \times AC \times \sin 60^\circ = \frac{1}{2} \times \sqrt{3} \times \sqrt{2 + \sqrt{3}} = \frac{\sqrt{3}}{2} \times \sqrt{2 + \sqrt{3}}$$

$$\frac{r}{\sin \alpha} = \frac{r}{\sin \beta} = \frac{r}{\sin \gamma} \quad \checkmark$$

$$S_{ABC} = \frac{1}{2} + \frac{1}{2} + \frac{\sqrt{3}}{2} = \frac{3 + \sqrt{3}}{2}$$

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$$S = AB \times AC \times \sin \alpha \times \frac{1}{2} \Rightarrow S = \frac{1}{2} \times \frac{1}{2} \times \frac{\sqrt{3}}{2} \times \frac{\sqrt{3}}{2} = \frac{3}{4} = S \quad \checkmark$$

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$$r \cos^2 \alpha - r \sin^2 \alpha (-\cos 2\alpha) \rightarrow r (\cos^2 \alpha + \sin^2 \alpha \cos 2\alpha) + 1$$

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

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

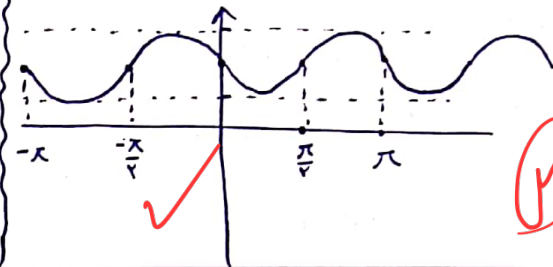
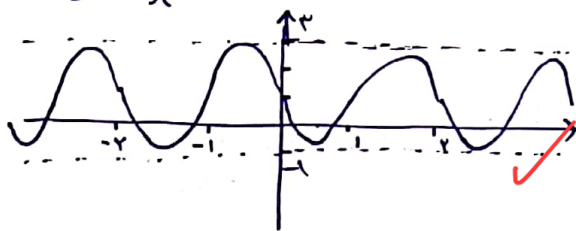
$$\Rightarrow \cos 2\alpha = 1 \rightarrow \sin 2\alpha = 0 \quad \checkmark$$

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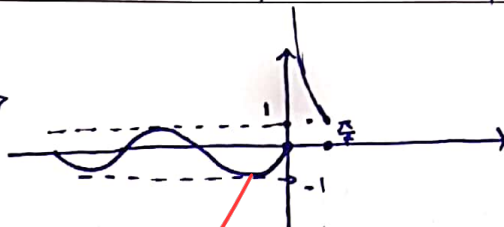
$$y = 2 \cos \left(\pi x + \frac{\pi}{4} \right) + 1 = 2 \sin \pi x + 1 \quad \rightarrow \quad y = -\sin 2x + 2 \quad T = \frac{2\pi}{|b|} = \pi$$

$$T = \frac{2\pi}{b} = \frac{2\pi}{\pi} = 2 \quad \max = 2+1=3, \min = -2+1=-1$$



$$f(x) = \begin{cases} \cot x & ; 0 < x < \frac{\pi}{2} \\ \sin x & ; x \leq 0 \end{cases}$$

$\Rightarrow$



$$\text{بأنوجه نمودار} \rightarrow R_f = [-1, +\infty)$$

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$$a + \frac{b}{c} \sin(\pi \cos x) \cos \pi x = a + \frac{b}{c} \sin \pi c x \quad \text{بأنوجه نمودار} \rightarrow a > 0, b > 0, c > 0$$

$$T = \frac{2\pi}{c} = \frac{2\pi}{1} \Rightarrow c = 1, 5$$

$$C = \frac{a}{f}$$

$$\left. \begin{matrix} \min = 0 = a - \frac{b}{f} \\ \max = f = a + \frac{b}{f} \end{matrix} \right\} \rightarrow \begin{cases} a = 2 \\ b = 1 \\ c = 1, 5 \end{cases}$$

$$\frac{bc}{a} = 5$$

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$$\text{بأنوجه نمودار} \rightarrow \max = 2 \Rightarrow |a| + d = 2 \rightarrow d = -1$$

$$\min = -f \Rightarrow -|a| + d = -f \rightarrow |a| = 3$$

$$\text{بأنوجه نمودار} \quad a < 0 \rightarrow a = -3$$

$$T = \pi \Rightarrow \frac{2\pi}{|b|} = \pi \rightarrow |b| = 2 \Rightarrow b = \pm 2 \rightarrow \text{در اینجا کینون ضرب} \rightarrow b = 2$$

(1, 1, 5)

$$f(x) = -3 \cos 2x - 1 \quad x = \frac{\pi}{4} \rightarrow -3 \cos 2x - 1 = 0 \rightarrow \cos 2x = -\frac{1}{3} \xrightarrow{\sin^2 + \cos^2 = 1} |\sin 2x| = \frac{\sqrt{10}}{3}$$

$$|\tan 2x| = \frac{\frac{1}{3}}{\frac{\sqrt{10}}{3}} = \frac{1}{\sqrt{10}} = \frac{\sqrt{10}}{10}$$

$$|\tan 2x| = \sqrt{10}$$

$$T = 2 \rightarrow f(kT + x) = f(x)$$

$$f((-17) \times 2 + 1, 5) = f(1, 5)$$

$$f(1, 5) \rightarrow m = \frac{1}{f}, b = 1 \rightarrow -0,5x + 1 \rightarrow x = 1,5 \Rightarrow f(1,5) = -0,5 \times 1,5 + 1 = 0,25$$

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