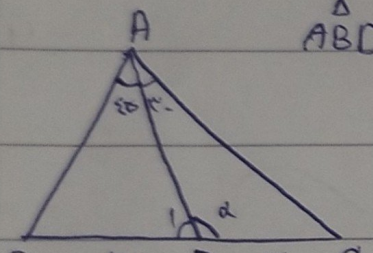
$$OB = \frac{1}{OB} \quad \cos\alpha = \frac{1}{OB}$$

$$\hat{OAB}: OA = 1 \;,\; AB = OB - OA \;,\; \cos\alpha = \frac{OT}{OB} \rightarrow OB = \frac{1}{\cos\alpha} \quad (1,5)$$

$$\Rightarrow AB = \frac{1}{\cos\alpha} - 1 = \frac{1}{\sqrt{1-\sin^2\alpha}} - 1$$



$$\hat{ABD}: \frac{AB}{\sin D_1} = \frac{BD}{\sin 45^\circ} \;,\; \hat{ACD}: \frac{AC}{\sin\alpha} = \frac{DC}{\sin 120^\circ} \quad (2)$$

$$D_1 + \alpha = 180^\circ \rightarrow \sin D_1 = \sin(180^\circ - \alpha) = \sin\alpha$$

$$\Rightarrow \frac{AB}{AC} = \frac{BD \times \sin 120^\circ}{DC \times \sin 45^\circ} = \frac{4 \times \frac{1}{2}}{3 \times \frac{\sqrt{2}}{2}} = \frac{2\sqrt{2}}{3} = \sqrt{2}$$

$$A\left|\begin{matrix}\frac{1}{2}\\ \frac{\sqrt{3}}{2}\end{matrix}\right. \quad B\left|\begin{matrix}\frac{\sqrt{3}}{2}\\ \frac{1}{2}\end{matrix}\right. \quad C\left|\begin{matrix}0\\ -1\end{matrix}\right. \quad \text{طول پاره‌خط} = \sqrt{\Delta x^2 + \Delta y^2} \quad (3)$$

(1)

$$AB = \sqrt{\left(\frac{\sqrt{3}}{2} - \frac{1}{2}\right)^2 + \left(\frac{1}{2} + \frac{\sqrt{3}}{2}\right)^2} = \frac{\sqrt{2}(\sqrt{3}-1)}{2} = AC$$

$$BC = \sqrt{\left(0 - \frac{\sqrt{3}}{2}\right)^2 + \left(1 - \frac{1}{2}\right)^2} = 1$$

$$P = AB + BC + AC = 1 + 2 \times \frac{\sqrt{6}-\sqrt{2}}{2} = 1 + \sqrt{6} - \sqrt{2}$$

$$S = \frac{1}{2} \times \frac{1}{2} \times \log_3^{16} \times \log_2^{27} = \frac{1}{4} \times 4 \log_3^2 \times \frac{3}{\log_3^2} = 2$$

$$= 2$$

Scbo

۴

$$2(\cos^4\alpha) - \cos^2\alpha - (\sin^2\alpha)(2\sin^2\alpha - 1)$$

$$2\cos^4\alpha - \cos^2\alpha - (1-\cos^2\alpha)(1-2\cos^2\alpha)$$

$$= 2\cos^4\alpha - \cos^2\alpha - 1 + 2\cos^2\alpha - 2\cos^4\alpha$$

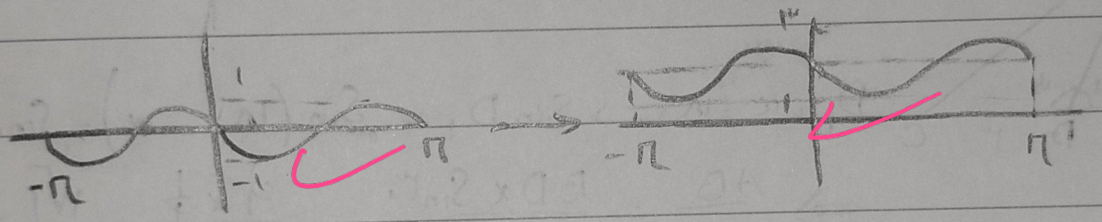
$$= 2\cos^2\alpha - 1 = 1 \rightarrow \cos^2\alpha = 1 \rightarrow \cos 2\alpha = 2\cos^2\alpha - 1$$

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

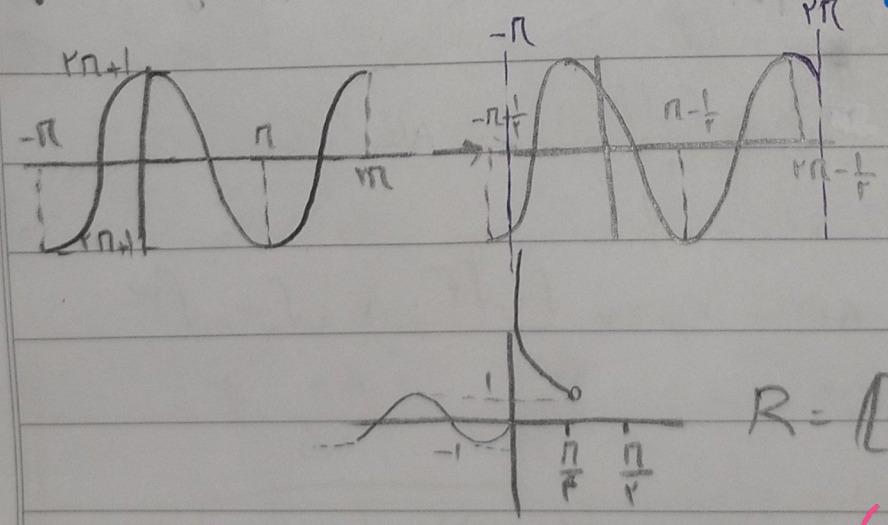
۲

الف) $y = -\sin 2x + 2$ ، $T = \frac{2\pi}{2} = \pi$ ۵

(۱٫۵)



ب) $2\pi\cos\left(x + \frac{1}{2}\right) + 1 \rightarrow T = \frac{2\pi}{\pi} = 2$ (۲)



$R = [-1, +\infty)$ ۷

(۲)

Scbd

$$f(x) = a + b\,\frac{\sin(2cx)}{2}\,\cos^2(cx)$$

$$= a + b\,\frac{\sin(4cx)}{4}$$

$$\left.\begin{array}{l} \max: |b| + a = 4 \\ \min: -|b| + a = 0 \end{array}\right\} \Rightarrow a = 2,\ |b| = 2,\ b = 2$$

$$T = \frac{2\pi}{4|c|} = \frac{\pi}{2|c|} = \frac{2\pi}{a} \Rightarrow 4c = a \rightarrow c = \frac{a}{4}$$

$$\Rightarrow \frac{bc}{a} = \frac{2 \times \frac{a}{4}}{2} = \frac{a}{4}$$

$$f(x) = a\cos bx + c$$

$$\left.\begin{array}{l} \max: |a| + c = 2 \\ \min: -|a| + c = -4 \end{array}\right\} \rightarrow c = -1,\ |a| = 3 \rightarrow a = -3$$

$$T = \frac{2\pi}{|b|} = \pi \rightarrow |b| = 2,\ b = 2$$

$$f(x) = -3\cos(2x) - 1 \xrightarrow{10^{\circ}} 0 = -3\cos(2\alpha) - 1$$

$$\cos(2\alpha) = -\frac{1}{3} \rightarrow \begin{array}{l} 3 \\ 2\alpha \\ 1 \end{array} \quad 2\sqrt{2} \rightarrow |\tan 2\alpha| = \frac{2\sqrt{2}}{1} = 2\sqrt{2}$$

$$f(x) = \begin{cases} 2x + 2 & -1 \le x < 0 \\ \frac{-x}{2} + 1 & 0 < x \le 2 \end{cases}$$

$$f(-3\pi + 0.5) = f(-3 \times 1.2 + 0.5)$$

$$= f(1.5) = \frac{1}{2} \times \frac{3}{4} + 1 = \frac{1}{4}$$