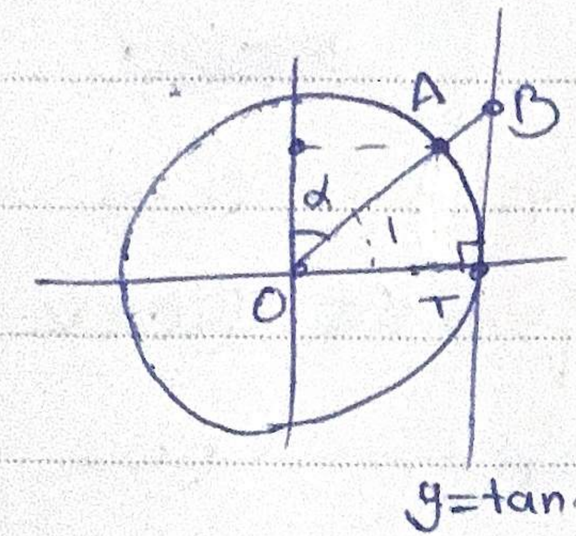
Date: Sub: تمرین تکلیف ۱۴

سوال ۱

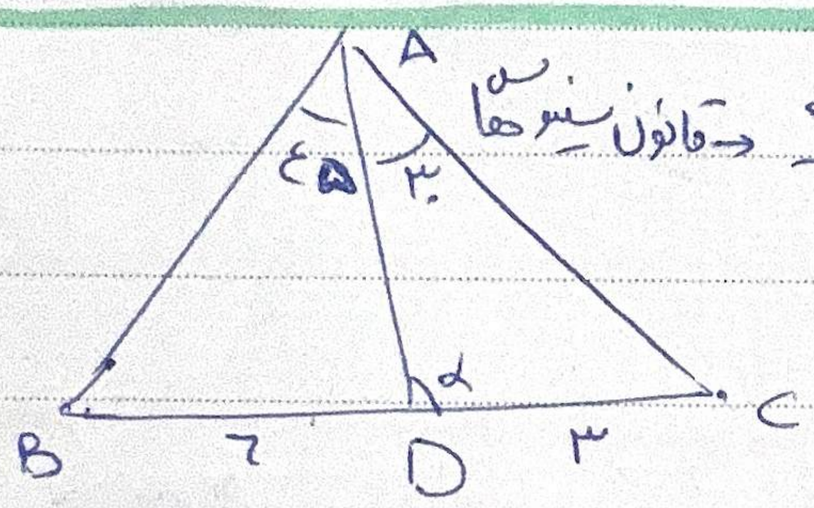


$TB = \tan\hat{O}_1 = \cot\alpha \quad OT = R = 1$

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

$AB = OB - OA = \frac{1}{\sin\alpha} - 1 = \frac{1-\sin\alpha}{\sin\alpha}$ ۲

سوال ۲



قانون سینوس‌ها → $\frac{\sin 45}{2} = \frac{\sin\hat{B}}{AD} \quad \frac{\sin\hat{C}}{AD} = \frac{\sin 30}{3}$

۲

$AD = \frac{2\times\sin\hat{B}}{\sqrt{2}/2} = \frac{3\times\sin\hat{C}}{1/2} \rightarrow \sqrt{2}\sin\hat{B} = \sin\hat{C}$

$\frac{\sin\hat{C}}{AB} = \frac{\sin\hat{B}}{AC} \rightarrow \frac{\sqrt{2}\sin\hat{B}}{AB} = \frac{\sin\hat{B}}{AC} \rightarrow \frac{AB}{AC} = \sqrt{2}$ ۲

Date: Sub:

سوال ۳ ۲

$A(\frac{1}{2}, \frac{\sqrt{3}}{2})$, $B(\frac{-\sqrt{3}}{2}, \frac{1}{2})$, $C(0, -1)$

الف)

$$S_{\overset{\Delta}{ABC}} = \frac{1}{2}\left|x_A(y_B-y_C)+x_B(y_C-y_A)+x_C(y_A-y_B)\right|$$

$$= \frac{1}{2}\left|\frac{1}{2}\left(\frac{1}{2}+1\right)+\left(\frac{-\sqrt{3}}{2}\right)\left(-1-\frac{\sqrt{3}}{2}\right)+0\right| = \frac{1}{2}\left|\frac{3}{4}+\frac{4\sqrt{3}+3}{4}\right| = \frac{6+2\sqrt{3}}{8}$$

$$= \frac{3+\sqrt{3}}{4}$$ ✓

ب)

$$AB = \sqrt{(x_A-x_B)^2+(y_A-y_B)^2}$$

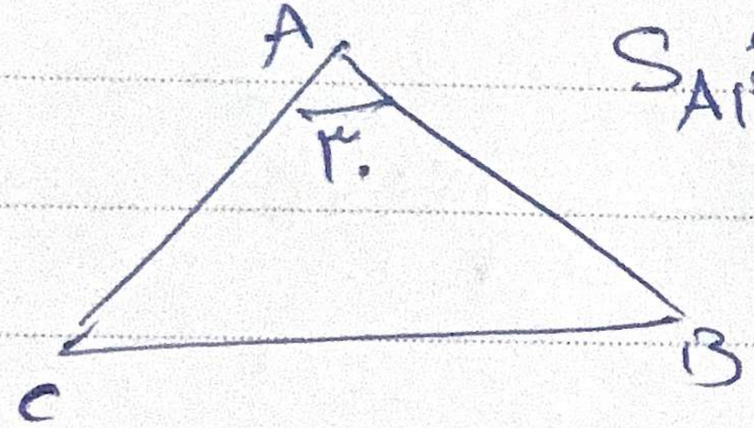
$$AB = \sqrt{\left(\frac{1}{2}+\frac{\sqrt{3}}{2}\right)^2+\left(\frac{\sqrt{3}}{2}-\frac{1}{2}\right)^2} = \sqrt{\frac{4+2\sqrt{3}+4-2\sqrt{3}}{4}} = \sqrt{2}$$

$$BC = \sqrt{\left(\frac{-\sqrt{3}}{2}\right)^2+\left(\frac{1}{2}+1\right)^2} = \sqrt{\frac{3+9}{4}} = \sqrt{3}$$

$$AC = \sqrt{\left(\frac{1}{2}\right)^2+\left(+1+\frac{\sqrt{3}}{2}\right)^2} = \sqrt{\frac{1+4+3+4\sqrt{3}}{4}} = \sqrt{2+\sqrt{3}}$$

$$\text{محیط} = \sqrt{2}+\sqrt{3}+\sqrt{2+\sqrt{3}}$$ ✓

سوال ۴ (۲)



$$S_{\triangle ABC} = \frac{1}{2} AB \times AC \times \sin A$$

$$S_{\triangle ABC} = \frac{1}{2} \times \log_2^{27} \times \log_3^{16} \times \frac{1}{2}$$

$$= \frac{1}{2} \times 4 \log_2^3 \times 2 \log_3^2 = 4 \quad \checkmark$$

سوال ۵ (۲)

$x = \cos\alpha \rightarrow 2\cos^4\alpha - \cos^2\alpha - 2\sin^2\alpha + \sin^2\alpha$,

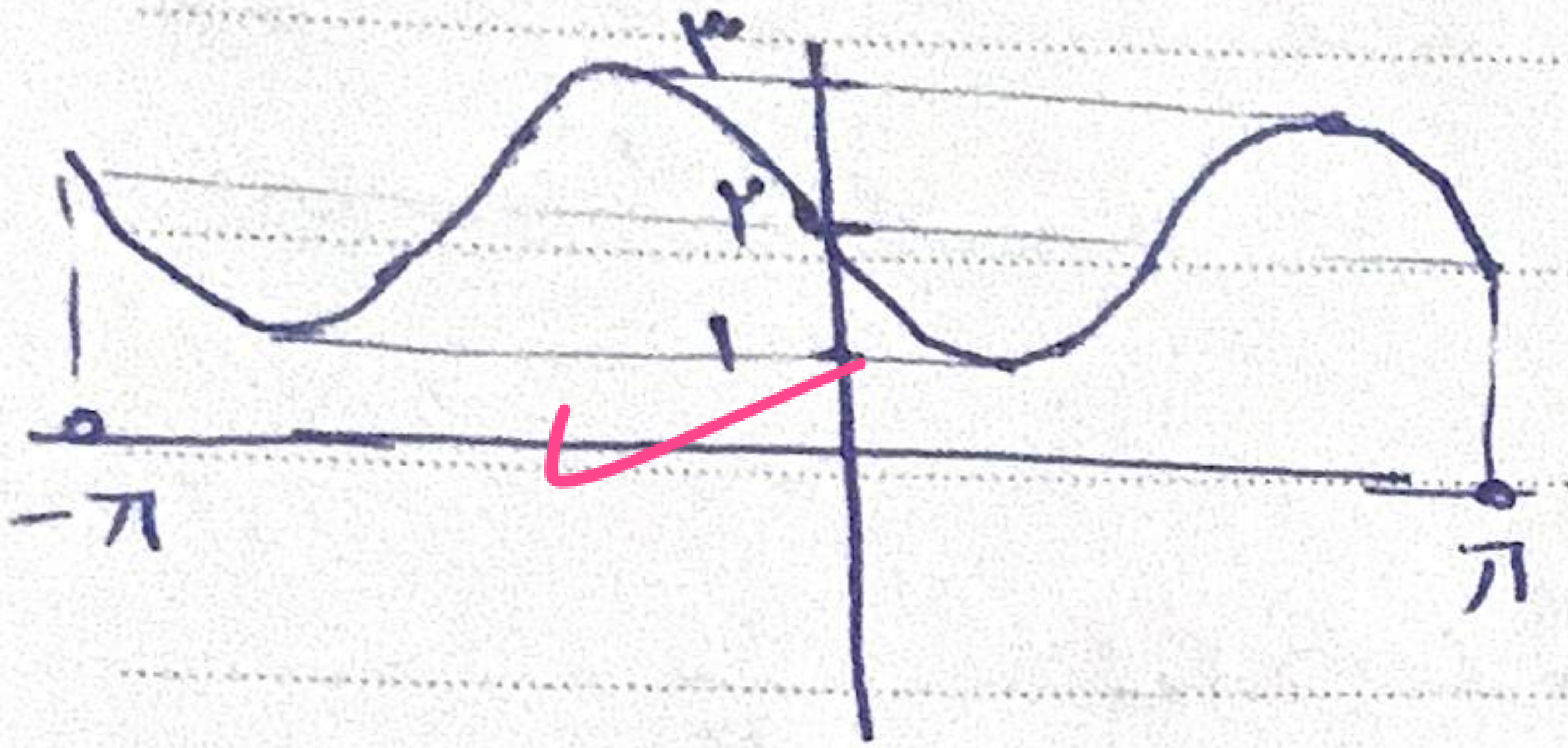
$= 2(\cos^2\alpha - \sin^2\alpha) + (\sin^2\alpha - \cos^2\alpha) = 2(\cos^2\alpha + \sin^2\alpha)(\cos^2\alpha - \sin^2\alpha)$

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

$= \cos 2\alpha = 1 \rightarrow \sin 2\alpha \rightarrow \sqrt{1-1} \rightarrow 0$ ✓

سوال I $[-\pi \ \pi] = D_f$ (۱۵ه)

$y = -۲\sin x \cos x + ۲ = ۲ - \sin ۲x$



$T = \frac{۲\pi}{۲} = \pi$

۲

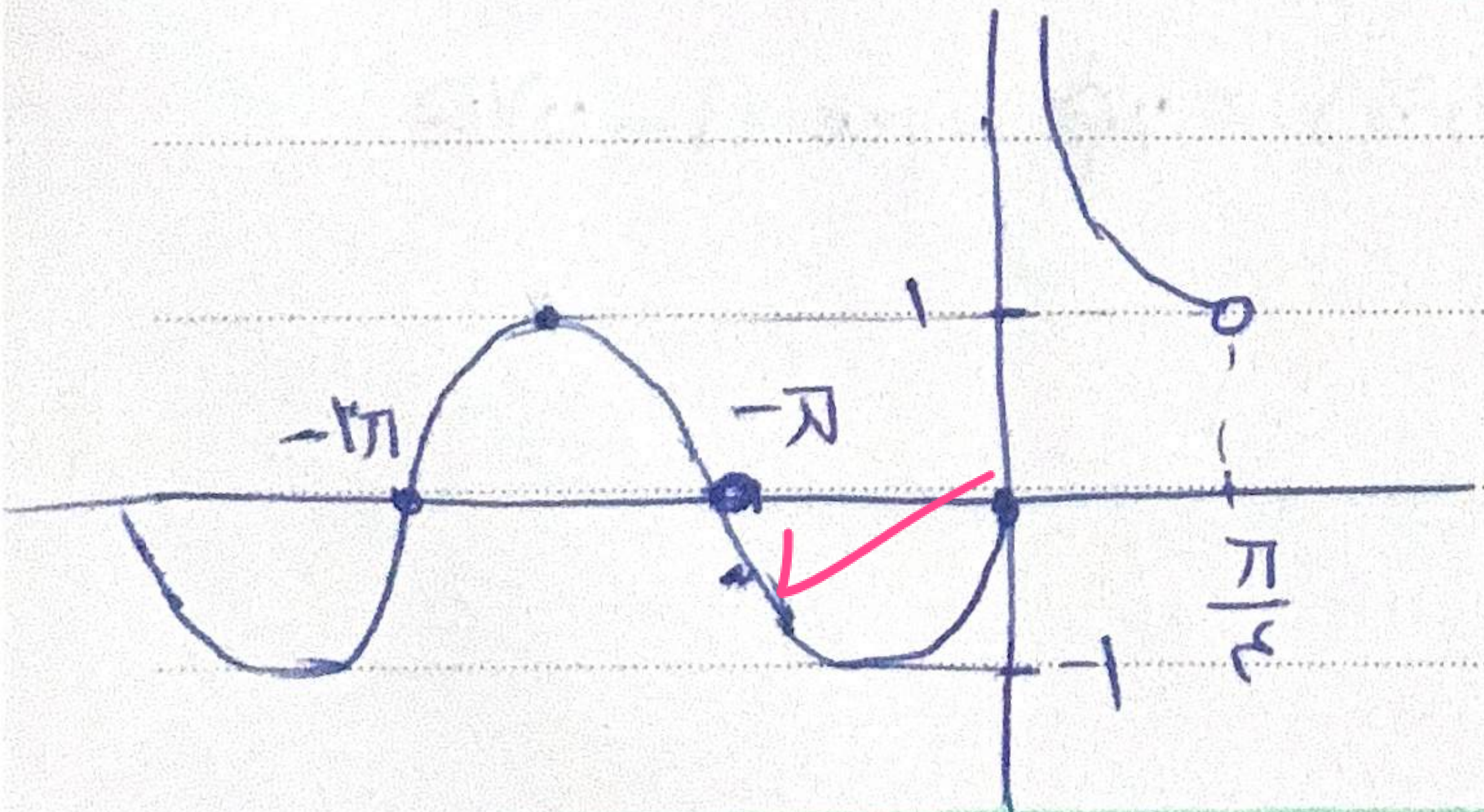
سوال ۶

ب) $y = 2\cos(\pi x + \frac{\pi}{2}) + 1 = 1 - 2\sin \pi x$ $\quad T = \frac{2\pi}{\pi} = 2$

$D_f = [-\pi , \pi]$

۲

سوال ۷



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

۲

$$f(x) = a + b \underbrace{\underbrace{\sin(cx) \times \cos(cx)}_{\frac{1}{2}\sin(2cx)} \times \cos(2cx)}_{\frac{1}{4}\sin(4cx)} = a + \frac{b}{4}\sin(4cx)$$ ۸ عالی

$\hookrightarrow \max = \left|\frac{b}{4}\right| + a = 4$

$\min = a - \left|\frac{b}{4}\right| = 0$

$\rightarrow a = 2 \,,\, \left|\frac{b}{4}\right| = 2$

$|b| = 8$

$$T = \frac{2\pi}{|4c|} = \frac{2\,8\pi}{20\,\omega} \xrightarrow{c>0} c = \frac{\omega}{4}$$

$$x = \frac{\pi}{10} \rightarrow 2 + \frac{b}{4} \times \sin\left(\frac{\pi}{10} \times \frac{\omega}{4} \times 4\right) = 2 + \frac{b}{4} = 4 \rightarrow b = +8$$

$$\frac{bc}{a} = \frac{8 \times \omega/4}{2} = \omega$$

سوال ۹ ②

$$\max = |a| + c = 2$$
$$\min = -|a| + c = -4$$

$c = -1$

$|a| = 3 \rightarrow a = -3$ چون نمودار نسبت به محور x ها قرینه شده است.

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

$$f(x) = -3\cos 2x - 1 = 0 \rightarrow \cos 2x = \frac{-1}{3} \xrightarrow{x=\alpha} \cos 2\alpha = -\frac{1}{3}$$

$$\rightarrow |\sin 2\alpha| = \sqrt{1 - \frac{1}{9}} = \frac{2\sqrt{2}}{3}$$

$$|\tan 2\alpha| = \left| \frac{\sin 2\alpha}{\cos 2\alpha} \right| = 2\sqrt{2}$$

سوال ۱۰

$f(-۳۴,۵) - f(۰,۵) \longrightarrow -۳۴,۵ = -۱ \times ۳۶ + ۱,۵$

$f(۰,۵) \downarrow -۱ + ۱,۵ = ۰,۵$

$$f(x) = \begin{cases} -\frac{۱}{۲}x + ۱ & ۰ \leq x < ۲ \\ ۲x + ۲ & -۱ \leq x < ۰ \end{cases}$$

$f(۰,۵) = -\frac{۱}{۲} \times ۰,۵ + ۱ = ۰,۷۵$