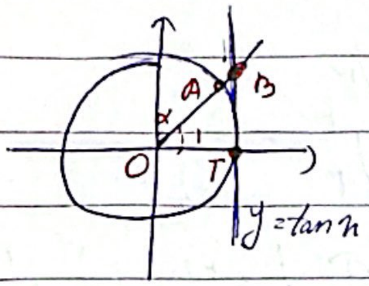
حریا شکرانیا

۱)



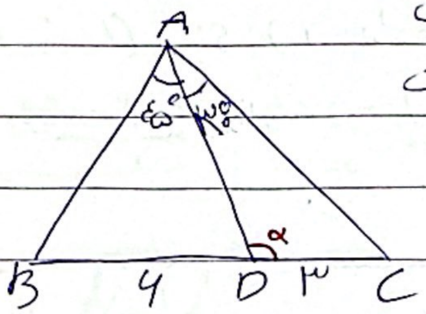
$\alpha + \beta = 90^\circ$

$\tan\beta = \cot\alpha = BT$

$OB^2 = 1 + \cot^2\alpha = \dfrac{1}{\sin^2\alpha} \rightarrow OB = \left|\dfrac{1}{\sin\alpha}\right| = \dfrac{1}{\sin\alpha}$ (sinα > 0) →

$\rightarrow AB = \dfrac{1}{\sin\alpha} - 1 = \dfrac{1-\sin\alpha}{\sin\alpha}$

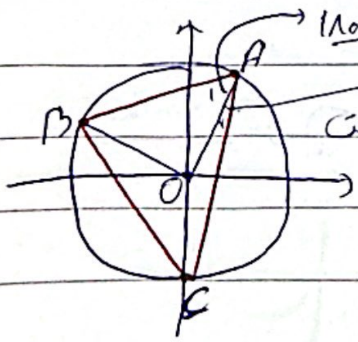
۲)



$\dfrac{\text{مساحت } ABD}{\text{مساحت } ADC} = \dfrac{\frac{1}{2}\times BD\times h}{\frac{1}{2}\times CD\times h} \rightarrow \dfrac{BD}{CD} = \dfrac{4}{3} = 2$

$\rightarrow \dfrac{\frac{1}{2}\times AB\times AD\times \sin 45 \; \left(\frac{\sqrt{2}}{2}\right)}{\frac{1}{2}\times AC\times AD\times \sin 30 \; \left(\frac{1}{2}\right)} = 2 \rightarrow \sqrt{2}\,\dfrac{AB}{AC} = 2 \rightarrow \dfrac{AB}{AC} = \sqrt{2}$

۳)



$\dfrac{180-90}{2} = 45^\circ$

$\dfrac{180-150}{2} = 15^\circ$

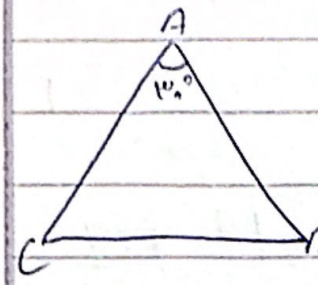
الف) $\text{مساحت} = \frac{1}{2}\times AB\times AC\times \sin 60 = \frac{1}{2}\times\sqrt{2}\times\sqrt{2+\sqrt{3}}\times\frac{\sqrt{3}}{2}$

$\dfrac{\sqrt{12+6\sqrt{3}}}{4} = \dfrac{3+\sqrt{3}}{4}$

ب) $AB = \sqrt{2}$, $BC = \sqrt{1+1-2\times(-\frac{1}{2})\times 1} = \sqrt{3}$, $AC = \sqrt{1+1-2\times 1\times(-\frac{\sqrt{3}}{2})} = \sqrt{2+\sqrt{3}}$

محیط $\rightarrow \sqrt{2} + \sqrt{3} + \sqrt{2+\sqrt{3}}$

s.a.m



$AC = \log_{۳}^{۱۹} = \log_{۳}^{۳^{۴}} = ۴\log_{۳}^{۳}$ ۴

$BC = \log_{۳}^{۳^{۲}\times۳} = \log_{۳^{۲}}^{۳^{۳}} = ۳\log_{۳}^{۳} = \frac{۳}{\log_{۳}^{۳}}$

$S_{ABC} = \frac{۱}{۲} \times AB \times AC \times \sin A = \frac{۱}{۲} \times ۴\log_{۳}^{۳} \times \frac{۳}{\log_{۳}^{۳}} \times \sin ۳۰ =$

$= \frac{۱}{۲} \times \frac{۱}{۲} \times ۴ \times ۳ = ۳$

$۳\pi^{۴} - \pi^{۲}\sin^{۲}(\alpha)(۳\sin^{۲}\alpha - ۱)$ $\pi \cdot \cos\pi = ۰ \to \cos\pi = \pi$ ۵

$۳\cos^{۴}\alpha - \cos^{۲}\alpha - \sin^{۲}\alpha(۳\sin\alpha - ۱) \to \cos^{۲}\alpha(۳\cos^{۲}\alpha - ۱) - \sin^{۲}\alpha(۳\sin^{۲}\alpha - ۱) \to$

$۳\cos^{۲}\alpha - ۱ = \cos^{۲}\alpha$ $\cos^{۲}\alpha(\cos^{۲}\alpha) - \sin^{۲}\alpha(-\cos^{۲}\alpha) \to \cos^{۲}\alpha(\underbrace{\cos^{۲}\alpha + \sin^{۲}\alpha}_{۱}) = ۱ \to$

$\to \cos^{۲}\alpha = ۱$ $\sin^{۲}\alpha + \cos^{۲}\alpha = ۱ \to \sin^{۲}\alpha = ۰$

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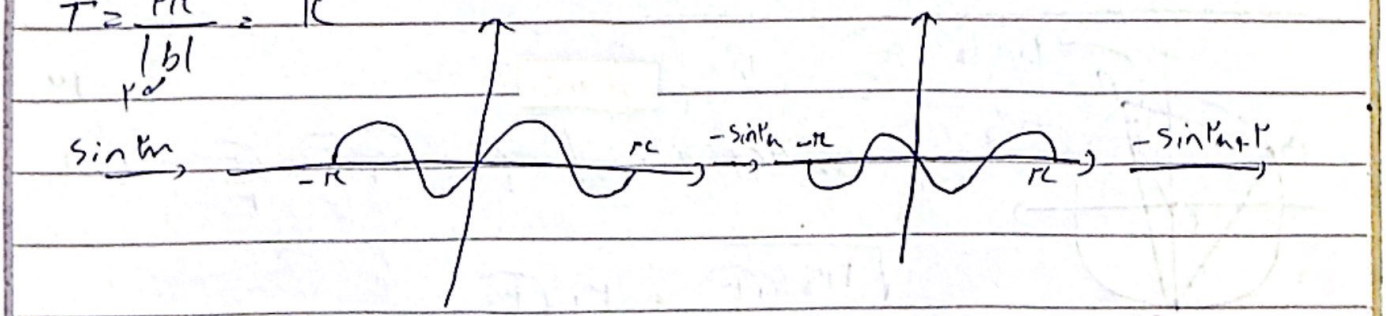
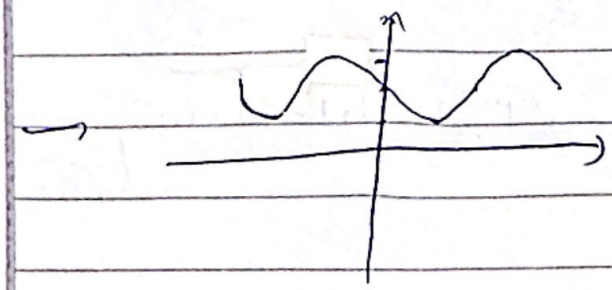
۶ (ول) $۲\sin\pi\cos\pi + ۲$ $[-\pi, \pi] \to -\sin^{۲}\pi + ۲$

$T = \frac{۲\pi}{|b|} = \pi$





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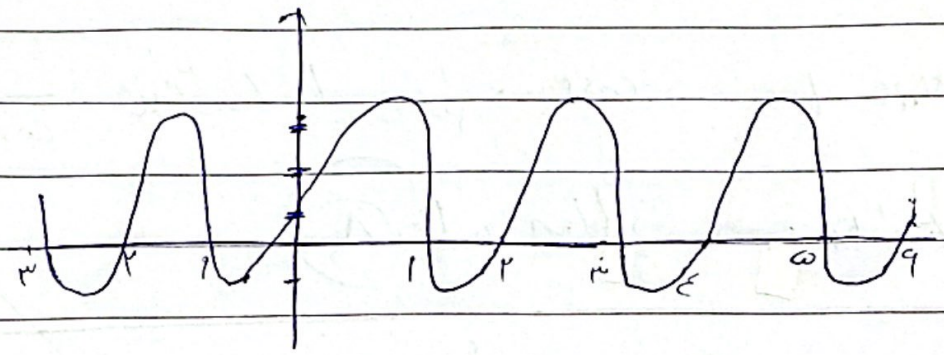
$y = 2\cos\left(x + \frac{1}{2}\right)\pi + 1 \quad [-\pi, 2\pi]$

$\downarrow$

$-2\sin \pi x + 1 \quad , T = \frac{2\pi}{|b|} = 2 \qquad max = |-2| + 1 = 3$

$min = -|-2| + 1 = -1$



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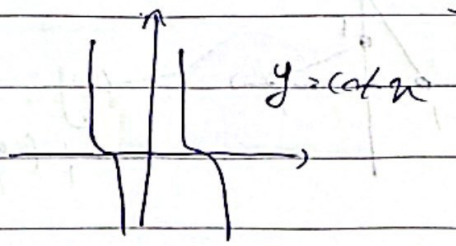
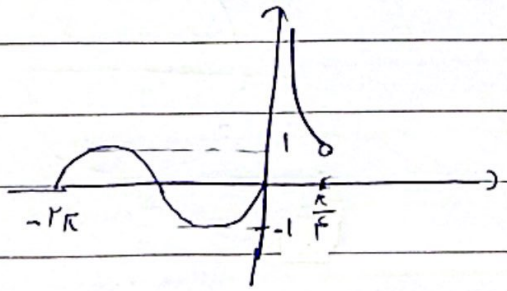
$$f(x) \begin{cases} \cot x & ; 0 < x < \frac{\pi}{2} \\ \sin x & ; x \leq 0 \end{cases}$$





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

$f(x) = a + b\sin(cx)\cos(cx)\cos(2cx) \xrightarrow{cx=\alpha} f(\alpha) = a + b\sin\alpha\cos\alpha\cos(2\alpha)$

$\rightarrow a + b \times \frac{1}{2}\sin 2\alpha \rightarrow a + \frac{b}{2}\sin 2\alpha = a + \frac{b}{2}\sin 2cx$ ($\frac{1}{2}\sin 2\alpha$ / $\frac{1}{2}\sin 2\alpha$)

$max = \left|\frac{b}{2}\right| + a = 5$

$min = -\left|\frac{b}{2}\right| + a = 0 \rightarrow a = 2, b = 4$ $\quad T = \frac{\pi}{2} - \frac{\pi}{10} = \frac{2\pi}{\omega} \Rightarrow 2c = \omega \rightarrow c = \frac{\omega}{2}$

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

s.a.m

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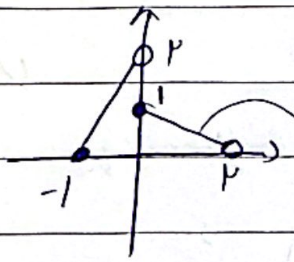
$f(x)=a\cos bx+c$ → $\max=|a|+c=۲$; $\min=-|a|+c=-۴$ → $c=-۱ , a=-۳$

$T=\pi=\frac{۲\pi}{|b|}\rightarrow b=۲$ $f(x)=-۳\cos ۲x-۱$

$-۳\cos۲x-۱=۰\rightarrow \cos۲x=-\frac{۱}{۳}$ $۱+\tan^۲ ۲x=\frac{۱}{\cos^۲ ۲x}$ →

$\rightarrow ۱+\tan^۲ ۲x=۹\rightarrow |\tan ۲x|=\sqrt{۸}$

$T=۳$ $-۳۴,۵+۱=-\frac{۳۳,۵}{۱۱T}\rightarrow f(-۳۴,۵)=f(۱,۵)$ → ۰,۲۵



$\rightarrow y=-\frac{۱}{۲}x+۱$

$-\frac{۱}{۴}(\frac{۳}{۲})+۱=\frac{۱}{۲}$