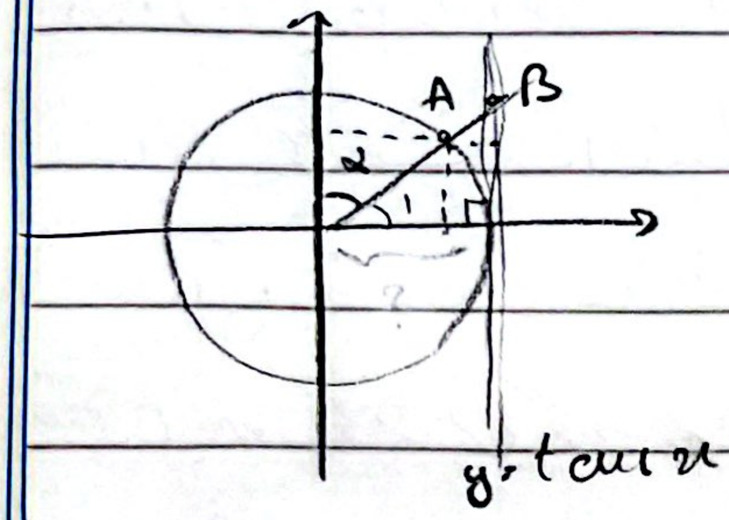
بنام خدا

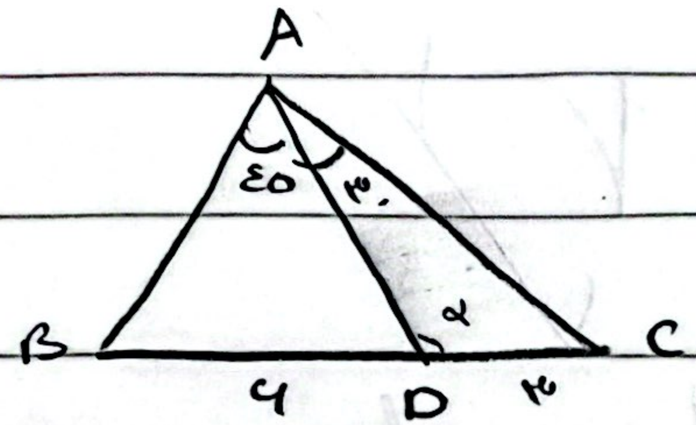


$\sin\alpha = \cos 1$ — 1

$\tan 1 - 1 = AB$

$\tan 1 \hookrightarrow \frac{\sin 1}{\cos 1} \rightarrow \frac{\sqrt{1-\sin^2\alpha}}{\sin\alpha} - 1 = AB$

$\sin^2 1 + \cos^2 1 = 1 \Rightarrow \sin 1 = \sqrt{1-\cos^2 1}$



$\frac{AB}{AC} = ?$

$\frac{۱۲}{\sqrt{۲}} = \frac{۹}{\frac{\sqrt{۲}}{۲}} = \frac{AB}{\sin(۱۸۰ - \alpha)} \Rightarrow AB = \frac{۱۲\sin\alpha}{\sqrt{۲}} - ۲$

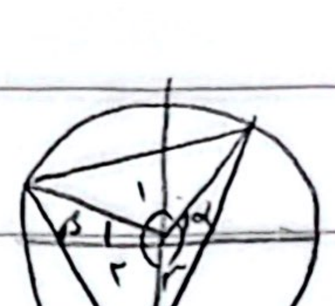
$\sin(۱۸۰ - \alpha) \hookrightarrow \sin\alpha$

$۹ = \frac{۳}{\frac{۱}{۲}} = \frac{AC}{\sin\alpha} \Rightarrow AC = ۹\sin\alpha$

$\Rightarrow \frac{AB}{AC} = \left(\frac{\frac{۱۲\sin\alpha}{\sqrt{۲}}}{\frac{۹\sin\alpha}{۱}}\right) = \frac{۱۲}{۹\sqrt{۲}} = \frac{۲}{\sqrt{۲}} = \sqrt{۲}$

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

ا) $\alpha + \beta = 90$



$S_1 = \frac{1}{2} \sin 90 \times OA \times OB = \frac{1}{2} \times 1 \times 1 \times 1 = \frac{1}{2}$

$S_2 = \frac{1}{2} \sin 120 \times OB \times OC = \frac{1}{2} \times \frac{\sqrt{3}}{2} = \frac{\sqrt{3}}{4}$

$S_3 = \frac{1}{2} \sin 150 \times OC \times OA = \frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$

$S_{کل} = \frac{1}{4} + \frac{1}{2} + \frac{\sqrt{3}}{4} = \frac{3+\sqrt{3}}{4}$

ب) $AB = \sqrt{\left(\frac{1-\sqrt{3}}{2}\right)^2 + \left(\frac{\sqrt{3}+1}{2}\right)^2} = \sqrt{\frac{8}{4}} = \sqrt{2}$

$AC = \sqrt{\left(\frac{2+\sqrt{3}}{2}\right)^2 + \left(\frac{1}{2}\right)^2} = \sqrt{\frac{4+3+4\sqrt{3}}{4}} = \sqrt{\frac{8+4\sqrt{3}}{4}} = \sqrt{2+\sqrt{3}}$

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

$صفحا = \sqrt{2} + \sqrt{3} + \sqrt{2+\sqrt{3}}$

$$AC = \log_{۳}^{۱۶} = \log_{۳}^{۲^۴} = ۴\log_{۳}^{۲} \quad -۴$$

$$BC = \log_{۲}^{۲۷} = \log_{۲}^{۳^۳} = ۳\log_{۲}^{۳} = \frac{۳}{\log_{۳}^{۲}}$$

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

$$S_{ABC}^{\Delta} = \frac{۱}{۲} \times \frac{۱}{۲} \times ۴ \times ۳ = ۳$$

$$x - \cos\alpha = ۰ \Rightarrow x = \cos\alpha \quad -ب$$

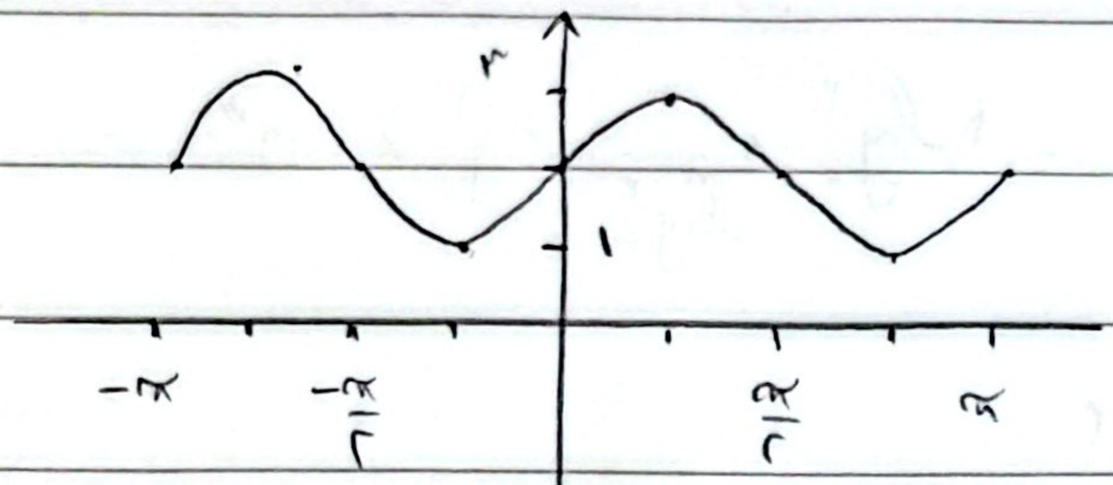
$$۴\cos^{۴}\alpha - \cos^{۲}\alpha - \sin^{۲}\alpha\,(۲\sin^{۲}\alpha - ۱) = \cos^{۲}\alpha\,(۲\cos^{۲}\alpha - ۱) + \sin^{۲}\alpha\,(۱ - ۲\sin^{۲}\alpha)$$

$$= \cos ۲\alpha\,(\cos^{۲}\alpha + \sin^{۲}\alpha) = ۱ \Rightarrow \cos ۲\alpha = ۱ \Rightarrow$$

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

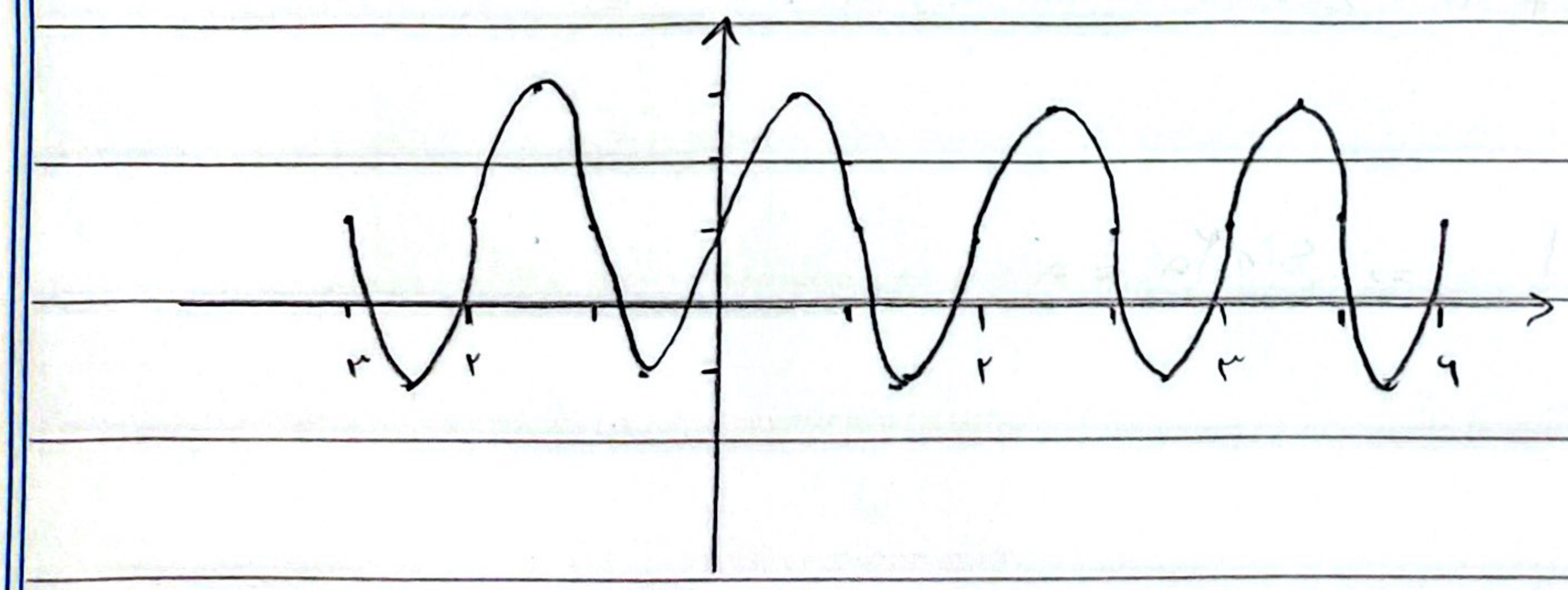
۴- الف) $-۲\sin\alpha\cdot\cos\alpha+۲ = -\sin۲\alpha+۲$ $\quad [-\pi,\pi]$

$T=\frac{۲\pi}{۲}=\pi$, $max = |-۱|+۲ = ۳$, $min = -|-۱|+۲ = ۱$

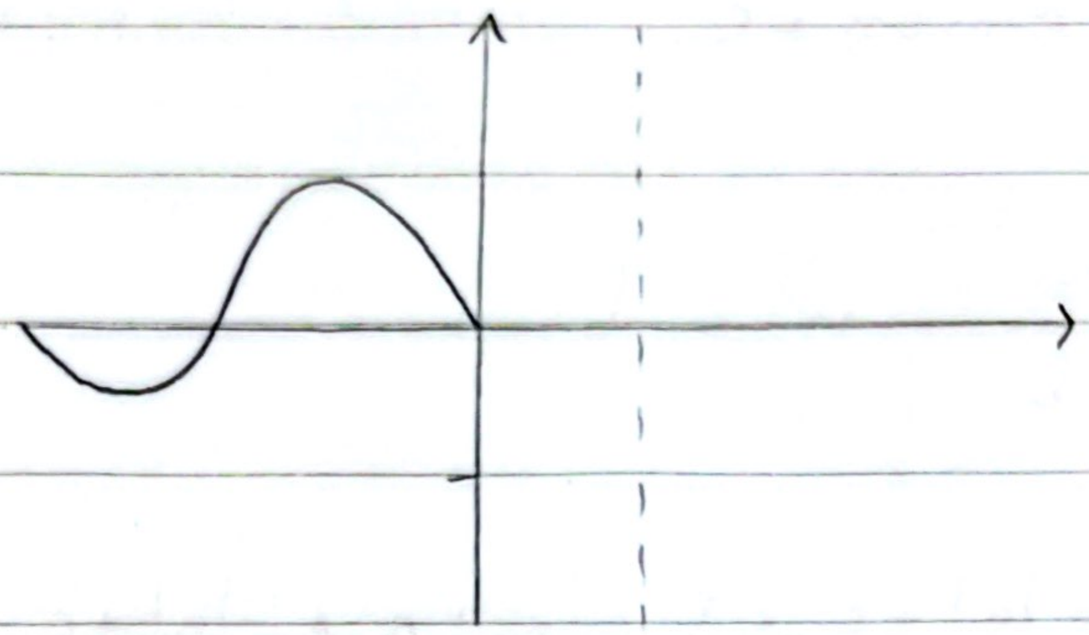


ب) $۲\cos(n+\frac{۱}{۲})\pi+۱ = ۲\cos(\frac{\pi}{۲}+\pi n)+۱ = -۲\sin\pi n+۱$

$T=\frac{۲\pi}{\pi}=۲$, $max = |-۲|+۱ = ۳$, $min = -|-۲|+۱ = -۱$



$$\begin{cases} \cot g & 0 < x < \frac{\pi}{2} \\ \sin x & x \leq 0 \end{cases}$$



$R = (-1, 1]$

$f(x) = a + b \sin(cx) \cdot \cos(cx) \cdot \cos(2cx) =$

$$a + \frac{b}{2} \sin(2cx) \cdot \cos(2cx) = a + \frac{b}{4} \sin(4cx)$$

$$T = \frac{3\pi}{10} - \frac{\pi}{10} = \frac{2\pi}{10} = \frac{2\pi}{3} = \frac{2\pi}{2c} \Rightarrow c = \frac{3}{4}$$

$$\min = a - \left|\frac{b}{2}\right| = 0 \Rightarrow a = \left|\frac{b}{2}\right| \Rightarrow ab > 0$$

$$\max = a + \left|\frac{b}{4}\right| = 4 \Rightarrow 2a = 4 \Rightarrow a = 2, \frac{b}{2} = 2 \Rightarrow b = 4$$

$$\frac{bc}{a} = \frac{4 \times \frac{3}{2}}{2} = 3$$

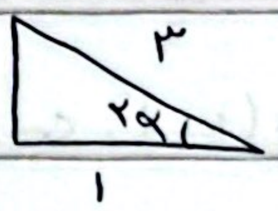
$f(x) = a\cos bx + c$ — 9

$T = \frac{2\pi}{b} = \pi \Rightarrow b = 2$

$max = |a| + c = 2$, $min = -|a| + c = -4 \Rightarrow c = -1, a = -3$

$f(x) = -3\cos 2x - 1 \Rightarrow f(\alpha) = -3\cos^2\alpha - 1 = 0$

$-3\cos 2\alpha - 1 = 0 \Rightarrow \cos 2\alpha = -\frac{1}{3} \Rightarrow$



$|\tan 2\alpha| = 2\sqrt{2}$

10- $y = f(x) = f(x \pm T)$

$f(-34,3) = f(x - 34) \Rightarrow x - 34 = -34,3 \Rightarrow f(1,3)$

$f(1,3) = -\frac{1}{2}x + 1$

$f(1,3) = -\frac{1}{2}\left(\frac{3}{2}\right) + 1 = \frac{-3}{4} + 1 = \frac{1}{4} = 0,25$