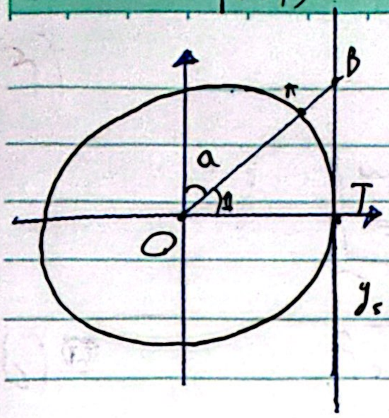
آروین خالق‌زاده

SUBJECT: فرض $(R=1)$

DATE:

(۱



$AB=?$

$OT=1$

$\cos_1 = \frac{OT}{OB} = \frac{1}{OB} \Rightarrow (1, a)$ متمم

اسم زاویه است این

تبدیل به نسبت جدولی میکنیم

(۱)

$OA=R=1$ (۲)

این دو ثابت‌اند

$\cos_1 = \sin a \Rightarrow OB = \frac{1}{\sin a}$

(۲)(۱)

$$\Rightarrow AB = OB - OA = \frac{1}{\sin a} - 1 = \boxed{\frac{1-\sin a}{\sin a}}$$

(۲

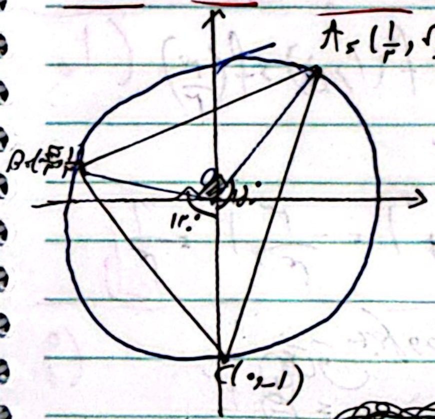
$\frac{AB}{AC}=?$

$S_{A\hat{D}C} = \frac{1}{2}\cdot AD\cdot DC\cdot \sin a$

$S_{A\hat{D}B} = \frac{1}{2}\cdot AD\cdot DB\cdot \sin(90-a) = \frac{1}{2}\cdot AD\cdot BD\cdot \sin a$

$$\Rightarrow \frac{S_{A\hat{D}C}}{S_{A\hat{D}B}} = \frac{CD}{BD} = \frac{3}{6} = \frac{1}{2} \Rightarrow \frac{AB}{AC} = \frac{\frac{1}{1}}{\frac{1}{\sqrt{2}}} = \sqrt{2}$$

(۳



$$\left.\begin{aligned} &\Rightarrow S_{A\hat{O}C} = \frac{1}{2}\times\frac{1}{2} = \frac{1}{4} \\ &S_{A\hat{O}B} = \frac{1}{2}\times\frac{1}{1} = \frac{1}{2} \\ &S_{B\hat{O}C} = \frac{1}{2}\times\frac{\sqrt{3}}{2} = \frac{\sqrt{3}}{4} \end{aligned}\right\} \Rightarrow \underbrace{S_{ABC} = \sum S = \frac{3+\sqrt{3}}{4}}$$

$$\left.\begin{aligned} &AB = \sqrt{OA^2+OB^2-2\,OA\,OB\cos 90^\circ} = \sqrt{2} \\ &AC = \sqrt{OA^2+OC^2-2\,OA\,OC\cos 150^\circ} = \sqrt{2+\sqrt{3}} \\ &BC = \sqrt{OB^2+OC^2-2\,OB\,OC\cos 120^\circ} = \sqrt{3} \end{aligned}\right\} \text{محیط} = AB+AC+BC = \sqrt{3}+\sqrt{2}+\sqrt{2+\sqrt{3}}$$

(۴

$S = \frac{1}{2} \times AB \times AC \times \sin 30 = \frac{1}{2} \times \log_2 27 \times \log_3 16$

$= \frac{1}{4} \times 3\log_2 3 \times 4\log_3 2 = \frac{1}{4} \times 3 \times 4 \times \frac{\cancel{\log 3}}{\log 2} \times \frac{\cancel{\log 2}}{\cancel{\log 3}} = 3$

(۵

$2x^4 - x^2 - \sin^2(a)(2\sin^2 a - 1)$ $\quad x = \cos a \Rightarrow \sin 2a = ?$

(1)

جایگذاری

$\Rightarrow 2\cos^4 a - \cos^2 a - \sin^2 a(2\sin^2 a - 1) = 1$

$= \cos^2 a(2\cos^2 a - 1) - 2\sin^4 a + \sin^2 a = 1$

$= \cos^2 a(\cos 2a) - \sin^2 a(2\sin^2 a - 1) = 1$

$= \cos^2 a(\cos 2a) + \sin^2 a \cos 2a = 1$

$= \cos^2 a(\cos 2a) + \sin^2 a(\cos 2a) = \cos 2a(\sin^2 a + \cos^2 a) = 1$

$\Rightarrow \cos 2a = 1 \Rightarrow \sin 2a = 0$

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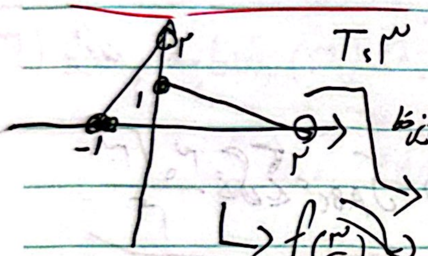

$T = 3 \quad f(-31{,}5) = f(3K - 31{,}5) = f(1{,}5) = f(\frac{3}{2})$

بدست آوردن معادله خط

کوچکترین kای که بزرگ‌تر از ۳۱ $\quad K = 11$

$\Rightarrow f(\frac{3}{2}) = -\frac{1}{2}x + 1 \Rightarrow f(\frac{3}{2}) = -\frac{1}{2} \times \frac{3}{2} + 1 = -\frac{3}{4} + 1 = \frac{1}{4}$

(۹

$a\cos bx + c$

$T = \pi \Rightarrow |b| = 2 \quad |a| + c = 2$

با جایگذاری در فرمول کسینوس $c = -1$

$-|a| + c = -4 \Rightarrow |a| = 3 \Rightarrow a = \pm 3$

$a = -3$

$\Rightarrow b = \pm 2$ با توجه به شکل

$c = -1$

$\Rightarrow y = -3\cos 2x - 1 \Rightarrow \cos 2x = -\frac{1}{3} \Rightarrow \sin x = \frac{2\sqrt{2}}{3}$

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

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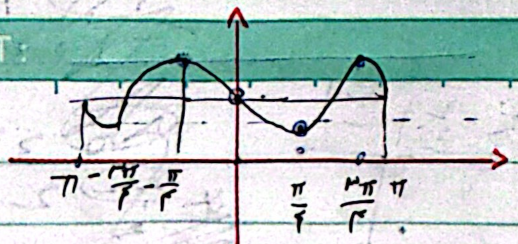
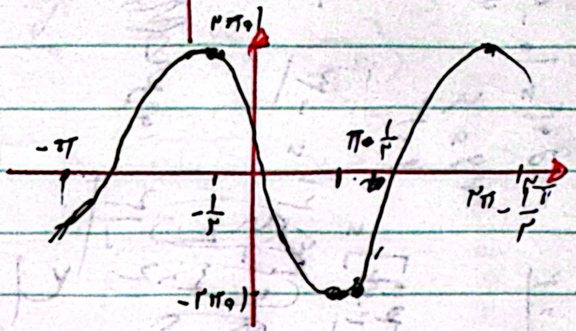
$y = 2\sin x\cos x = -\sin 2x + 2 \Rightarrow$ $[-\pi, \pi]$



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



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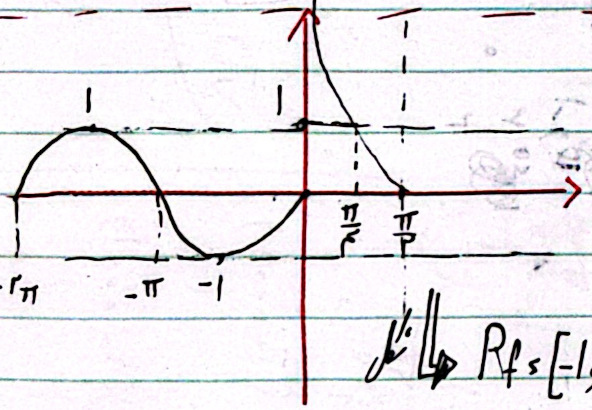
$$f(x) = \begin{cases} \cot x & ; 0 < x < \frac{\pi}{2} \\ \sin x & ; x \leq 0 \end{cases}$$



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

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۸)

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

$T = \left(\frac{\pi}{2} - \frac{\pi}{10}\right) = \frac{2\pi}{5} \Rightarrow \frac{2\pi}{5} = \frac{2\pi}{4c} \Rightarrow c = \frac{5}{4}$

$\Rightarrow f(x) = a + \frac{b}{4}\sin(5x) \Rightarrow \min = -1,\ \max = 1$

$\Rightarrow a + \frac{b}{4} = 4$, $a - \frac{b}{4} = 0$ $\Rightarrow a = 2$, $b = 8$ $\rightarrow \frac{bc}{a} = \frac{8 \times \frac{5}{4}}{2} = 5$

عقق $\Rightarrow \frac{5\pi}{2} = \max \sin \hookrightarrow = \frac{\pi}{2}$