نام و نام خانوادگی ..آ.. امیرسینا جعفری   پاسخنامه مثلثات شماره ۱٤.۱....   کلاس ۱۲۱۳..   ۲۰ آفرین!!

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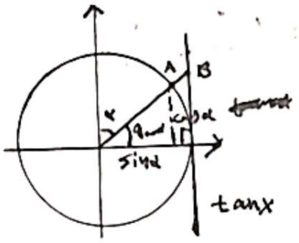

$$\frac{۱}{۱+AB}=\frac{\cos\alpha}{\cot\alpha}$$

$$\frac{۱}{۱+AB}=\sin\alpha$$

$$۱+AB=\frac{۱}{\sin\alpha}\Rightarrow AB=\frac{۱}{\sin\alpha}-۱$$ ✓

۲

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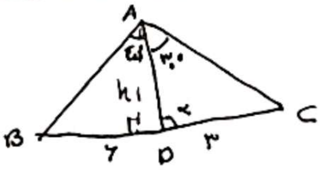


$S=\frac{۱}{۲}ah$

$$\frac{S_{A\hat{D}C}}{S_{A\hat{B}D}}=\frac{۱}{۲}=\frac{\frac{۱}{۲}\times ۳\times h}{\frac{۱}{۲}\times ۶\times h}$$

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

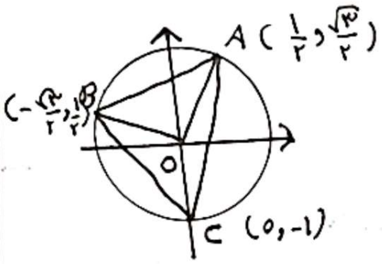
$$\left.\begin{array}{l}S_{A\hat{D}C}=\frac{۱}{۲}AD\cdot AC\sin ۳۰^\circ\\ S_{A\hat{D}B}=\frac{۱}{۲}AD\cdot AB\sin ۴۵^\circ\end{array}\right\}\Rightarrow\frac{S_{A\hat{D}C}}{S_{A\hat{D}B}}=\frac{AC}{AB}\times\frac{\sin ۳۰^\circ}{\sin ۴۵^\circ}$$

$$=\frac{۱}{۲}\times\frac{\frac{\sqrt{۲}}{۲}}{\frac{۱}{۲}}=\frac{\sqrt{۲}}{۲}=\frac{AC}{BA}$$

$$\Rightarrow\frac{AB}{AC}=\sqrt{۲}$$ ✓

۲

۳



الف) $S_{ABC}=?$

$$S_{A\hat{B}C}=\frac{۱}{۲}\begin{vmatrix}\frac{۱}{۲}&\frac{\sqrt{۳}}{۲}&۱\\-\frac{\sqrt{۳}}{۲}&\frac{۱}{۲}&۱\\۰&-۱&۱\end{vmatrix}=\frac{\sqrt{۳}+۳}{۴}$$ ✓

ب)

$$AC^۲=(۰-\frac{۱}{۲})^۲+(\frac{\sqrt{۳}}{۲}+۱)^۲=۲+\sqrt{۳}\Rightarrow AC=\sqrt{۲+\sqrt{۳}}$$ ✓

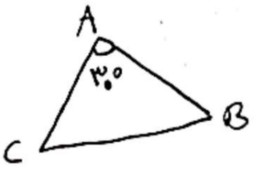
$$AB^۲=(\frac{۱}{۲}+\frac{\sqrt{۳}}{۲})^۲+(\frac{\sqrt{۳}}{۲}-\frac{۱}{۲})^۲=۲\Rightarrow AB=\sqrt{۲}$$ ✓

$$BC^۲=(۰+\frac{\sqrt{۳}}{۲})^۲+(-۱-\frac{۱}{۲})^۲=۳\Rightarrow BC=\sqrt{۳}$$ ✓

$$\boxed{AB+BC+AC=\sqrt{۲+\sqrt{۳}}+\sqrt{۲}+\sqrt{۳}}$$

۲

۴



$AC=\log_{۳}^{۱۶}\qquad AB=\log_{۲}^{۲۷}$

$$S_{A\hat{B}C}=\frac{۱}{۲}AB.AC\sin ۳۰^\circ=\frac{۱}{۲}(\log_{۲}^{۲۷})(\log_{۳}^{۱۶})\times\frac{۱}{۲}$$

$$=\frac{۱}{۲}\left(\frac{\overset{۳}{\cancel{\log ۲۷}}}{\cancel{\log ۲}}\times\frac{\overset{۴}{\cancel{\log ۱۶}}}{\cancel{\log ۳}}\right)\frac{۱}{۲}=\boxed{۳}$$ ✓

۲

۵

$$۲x^۴-x^۲-\sin^۲\alpha(۲\sin^۲\alpha-۱)\qquad x-\cos\alpha=۰\Rightarrow x=\cos\alpha$$

$$\underbrace{۲\cos^۴\alpha-\cos^۲\alpha-۲\sin^۴\alpha-\sin^۲\alpha}_{۲\cos ۲\alpha\quad -۱}=۲\cos ۲\alpha-۱=۱\Rightarrow\cos ۲\alpha=۱$$

$$\Rightarrow\boxed{\sin ۲\alpha=۰}$$

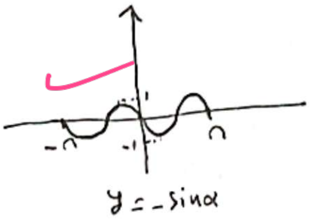
۲

۶

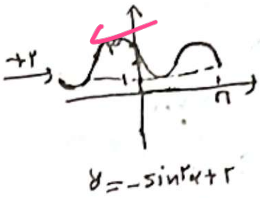
الف) $y=-2\sin x\cos x+2 \quad [-\pi,\pi]$

$\Rightarrow y=-\sin 2x+2$

$T=\frac{2\pi}{2}=\pi$ ✓

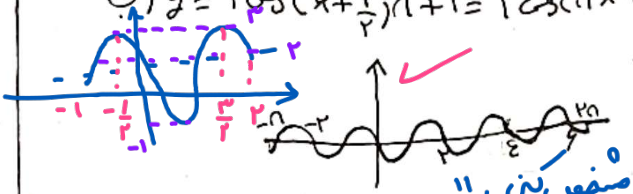


$y=-\sin x$



$y=-\sin 2x+2$

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



$T=\frac{2\pi}{\pi}=2$ ✓

②

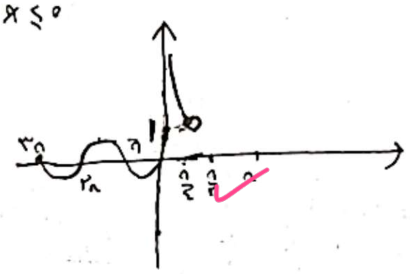
شکل ها را بهتر است بزرگتر بکشی و نقطه ها را روی محور x و y مشخص کنی

۷

$$f(x)=\begin{cases}\cot x & ; 0<x<\frac{\pi}{4}\\ \sin x & ; x\leq 0\end{cases}$$

برد تابع = ?

$R_f=[-1,+\infty)$ ✓



②

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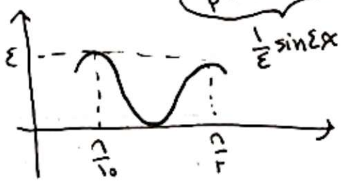
$f(x)=a+b\underbrace{\sin(cx)\cos(cx)}_{\frac{1}{2}\sin 2cx}\cos(2cx)$ $\qquad \frac{bc}{a}=?$ $\qquad f(x)=a+\frac{b}{4}\sin 4cx$

$\frac{1}{4}\sin 4cx$



$T=\frac{\pi}{2}-\frac{\pi}{10}=\frac{2\pi}{5}$

$T=\frac{2\pi}{|4c|}=\frac{2\pi}{5}\Rightarrow|c|=\frac{5}{4}\overset{c>0}{\Rightarrow}c=\frac{5}{4}$

$R_f=[0,4]$

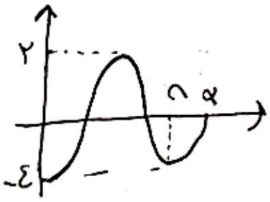
$a+\frac{b}{4}\sin\frac{\pi}{2}=a+\frac{b}{4}=4$

$a=2 \qquad \frac{|b|}{4}=2\Rightarrow|b|=8\Rightarrow b=8$

$\frac{bc}{a}=\frac{8(\frac{5}{4})}{2}=\boxed{5}$ ✓

②

۹



$f(x)=a\cos bx+c \qquad |\tan 2\alpha|=?$

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

$\frac{2+4}{2}=3=|a|\Rightarrow c=-1$

$\Rightarrow a=-3$

$f(x)=-3\cos 2x-1$

می‌دانیم بعد از صفر cos x نزولی است از آن جایی که در شکل صعودی است

$a<0$

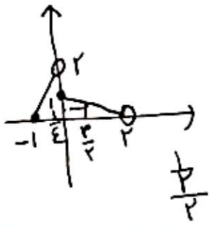
$f(\alpha)=-3\cos 2\alpha-1=0\Rightarrow\cos 2\alpha=-\frac{1}{3}$ ✓

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

②

۱۰

$y=f(x) \qquad T=3 \qquad f(-34.5)=?$



$\forall x\in D_f \quad f(x)=f(x+T)$

$f(-34.5)=f(-34.5+12T)=f(-34.5+36)=f(1.5)$

$=\boxed{\frac{1}{4}}$ ✓

$\frac{2}{2}=\frac{x}{1}\Rightarrow x=\frac{1}{4}$

②