نام: دینا الوری شماره کلاسی: ۱۴ متوسطه دوازدهم دختران B

①

$A\begin{vmatrix}\sin\alpha\\ \cos\alpha\end{vmatrix}$ $B\begin{vmatrix}1\\ \tan(90-\alpha)=\cot\alpha\end{vmatrix}$

$$AB=\sqrt{(\cos\alpha-\cot\alpha)^2+(\sin\alpha-1)^2}=\frac{1}{\sin\alpha}\cdot(\sin\alpha-1)=\frac{\sin\alpha-1}{\sin\alpha}$$

②

$$\frac{AC}{\sin\alpha}=\frac{DC}{\sin 60}\to AC=\frac{\frac{3}{2}\sin\alpha}{\frac{1}{2}}\qquad \frac{AB}{\sin(90-\alpha)}=\frac{BD}{\sin 60}\to AB=\frac{3\sin\alpha}{\frac{\sqrt{3}}{2}}\to\frac{AB}{AC}=\sqrt{3}$$

③

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

$$\frac{1}{2}\begin{vmatrix}\frac{1}{2} & \frac{\sqrt{3}}{2} & 1\\ -\frac{\sqrt{3}}{2} & \frac{1}{2} & 1\\ 0 & -1 & 1\end{vmatrix}=\frac{2+\sqrt{3}}{4}$$

ب) $AB=\sqrt{\left(\frac{1}{2}-\left(-\frac{\sqrt{3}}{2}\right)\right)^2+\left(\frac{\sqrt{3}}{2}-\frac{1}{2}\right)^2}=\sqrt{2}\qquad BC=\sqrt{\left(-\frac{\sqrt{3}}{2}-0\right)^2+\left(\frac{1}{2}-(-1)\right)^2}=\sqrt{3}$

$$AC=\sqrt{\left(\frac{1}{2}-0\right)^2+\left(\frac{\sqrt{3}}{2}-(-1)\right)^2}=\sqrt{2+\sqrt{3}}\to P=\sqrt{2}+\sqrt{3}+\sqrt{2+\sqrt{3}}$$

④

$$S=\frac{1}{2}AC\cdot AB\sin 15=\frac{1}{2}\times\log_{\sqrt{3}}^{9}\times\log_{3}^{27}=\frac{1}{2}\times\log_{3}^{2}\times 3\log_{3}^{3}=3\log_{3}^{2}\times\frac{1}{\log_{3}^{2}}=3$$

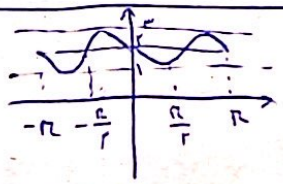
⑤

$$f(\cos\alpha)=1\to 2\cos^4\alpha-\cos^2\alpha-\sin^2\alpha(2\sin^2\alpha-1)=\cos^2\alpha\underbrace{(2\cos^2\alpha-1)}_{\cos 2\alpha}-\sin^2\underbrace{(2\sin^2\alpha-1)}_{-\cos 2\alpha}$$

$$\cos 2\alpha(\cos^2\alpha+\sin^2\alpha)=\cos 2\alpha=1\to\sin 2\alpha=0$$

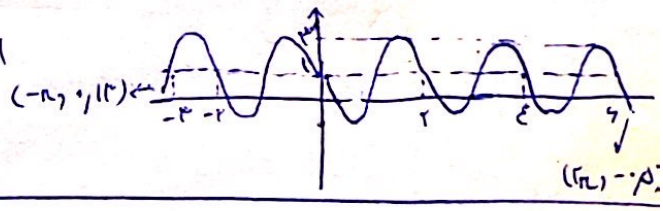
⑥

الف) $y=-\sin 2x+2\to T=\frac{2\pi}{2}=\pi$, $\min y=1$, $\max y=3$

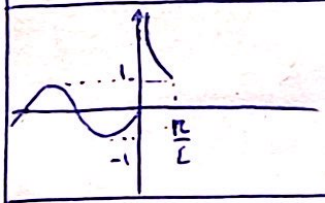


ب) $y=2\cos\left(2\pi x+\frac{\pi}{2}\right)+1=-2\sin 2\pi x+1$

$T=\frac{2\pi}{2\pi}=1$, $\min y=-1$, $\max y=3$



⑦



$\to R=[-1,+\infty)$

⑧

$$f(x)=a+b\sin(cx)\cos(cx)\cos(2cx)=a+\frac{b}{4}\sin 4cx\qquad T=\frac{2\pi}{5}=\frac{2\pi}{|4c|}\to c=\frac{5}{4}$$

$$\begin{cases}a+\left|\frac{b}{4}\right|=3\\ a-\left|\frac{b}{4}\right|=0\end{cases}\to 2a=6\to a=3,\ b=12\to\frac{bc}{a}=5$$

(9)

$y_{max} = c + |a| = 1$

$y_{min} = c - |a| = -3$

$\Rightarrow c = -1, a = -2$, $T = \pi = \frac{2\pi}{|b|} \Rightarrow b = 2$

$f(x) = -2\cos 2x - 1 = 0 \Rightarrow \cos 2x = \frac{-1}{2}$, $2\sin 2x = \sqrt{1 - \frac{1}{4}} = \frac{\sqrt{3}}{2}$

$\Rightarrow |\tan 2x| = \left|\frac{\sin 2x}{\sin 2x}\right| = \left|\frac{\frac{\sqrt{3}}{2}}{\frac{-1}{2}}\right| = \sqrt{3}$

(10)

$f(-3/8) = f(1/8)$ — $f(x) = \begin{cases} -1, 2x \in Q_2 \rightarrow y = 2x + 2 \\ \cdot, 2x \in Q_3 \rightarrow y = \frac{-1}{2}x + 1 \rightarrow f(1,8) = \frac{1}{4} \end{cases}$