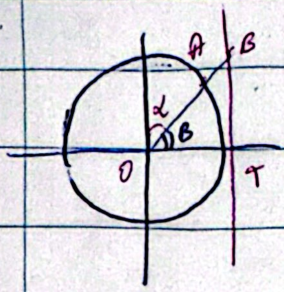
السید فاطمه محمدی

۱

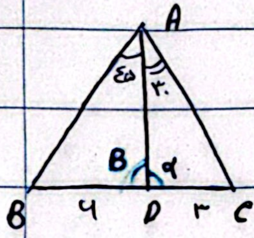


$AO = 1$ شعاع دایره

$OB = 1 + \tan^2 B \Rightarrow \frac{1}{\sin^2 \alpha}$ ($\tan^2 B = \cot^2 \alpha$)

$AB = OB - AO = \frac{1}{\sin^2 \alpha} - 1$

۲



$\alpha + B = 180 \Rightarrow \sin\alpha = \sin B$

$\frac{\sin 45}{4} = \frac{\sin B}{AB}$ $\quad \frac{\sin 30}{3} = \frac{\sin \alpha}{AC}$

به جای $\sin\alpha$ می‌ذاریم $\frac{\sqrt{2}AB}{4}$

$\frac{\frac{1}{2}}{3} = \frac{\sqrt{2}AB}{12AC}$

$\frac{AB}{AC} = \frac{4}{2\sqrt{2}} = \sqrt{2}$

۳

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

الف) مساحت مثلث؟

$$\begin{vmatrix} \frac{1}{2} & \frac{\sqrt{3}}{2} & 1 \\ \frac{\sqrt{3}}{2} & \frac{1}{2} & 1 \\ 0 & -1 & 1 \end{vmatrix} \begin{matrix} \frac{1}{2} & \frac{\sqrt{3}}{2} \\ \frac{\sqrt{3}}{2} & \frac{1}{2} \\ 0 & -1 \end{matrix}$$

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

ب)

$\overline{AB} = \sqrt{(\frac{\sqrt{3}}{2} - \frac{1}{2})^2 + (\frac{1}{2} - \frac{\sqrt{3}}{2})^2} = \sqrt{2 - 2\sqrt{3}}$

$\frac{3}{4} + \frac{1}{4} - \sqrt{3}$

$\overline{AC} = \sqrt{(\frac{1}{2})^2 + (\frac{\sqrt{3}}{2} + 1)^2} = \sqrt{2 + \sqrt{3}}$

$\frac{1}{4} + \frac{3}{4} + 1 + \sqrt{3}$

محیط $= \sqrt{2 - 2\sqrt{3}} + \sqrt{2 + \sqrt{3}} + \sqrt{3}$

$\overline{BC} = \sqrt{(\frac{\sqrt{3}}{2})^2 + (\frac{3}{2})^2} = \sqrt{3}$

$\frac{3}{4}$ $\quad \frac{9}{4}$

s.a.m

۱

$S_{\triangle ABC} = \frac{۱}{۲} AB \times AC \times \underbrace{\sin ۳}_{\frac{۱}{۲}} \dots$ $\log \frac{۳}{۲} = \frac{۱}{\log \frac{۲}{۳}}$

$\frac{\sin \hat{A}}{BC} = \frac{\sin \hat{B}}{AC}$ $BC = \log \frac{۲۷}{۴}$, $AC = \log \frac{۱۷}{۴}$ $\sin B = \frac{\log \frac{۱۷}{۲}}{۲ \log \frac{۸}{۲}} , \frac{۴ \log \frac{۳}{۲}}{۹ \log \frac{۳}{۲}} , \frac{۴}{۲ (\log \frac{۳}{۲})^۲}$

۵

$۲x^۴ - x^۲ - \sin^۲(\alpha)(۲\sin^۲\alpha - ۱) \Rightarrow ۲\cos^۴\alpha - \cos^۲\alpha - ۲\sin^۴\alpha + \sin^۲\alpha$

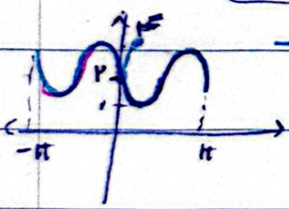
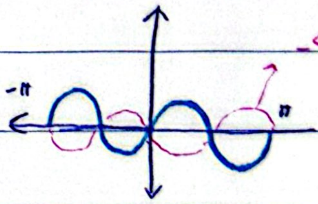
$۲\cos^۴\alpha - ۲\sin^۴\alpha - (\cos^۲\alpha - \sin^۲\alpha) = ۱$ $\cos ۲\alpha = ۱ \Rightarrow \sin ۲\alpha = ۰$

$۲\cos ۲\alpha - \cos ۲\alpha$

۶

الف) $y = -۲\sin\alpha \cos\alpha + ۲$

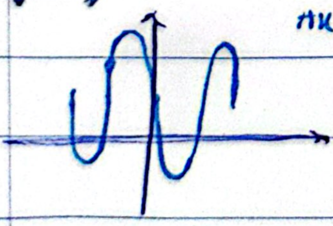
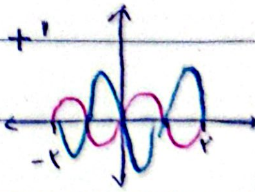
$-\sin ۲\alpha$ $T = \frac{۲\pi}{۲} = \pi$

$\sin ۲\alpha$

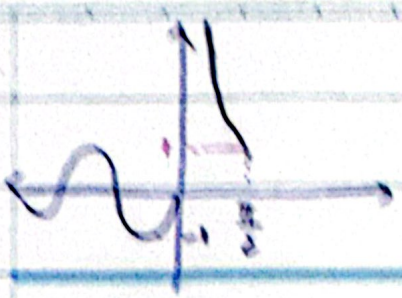
ب) $y = ۲\cos(x + \frac{۱}{۲})\pi + ۱ \Rightarrow y = -۲\sin \pi x + ۱$

$\pi x + \frac{\pi}{۲}$ $T = \frac{۲\pi}{\pi} = ۲$

s.a.m

(۷)



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

(۸)

$f(x) = a + b \sin(\omega x) \cos(\omega x) \cos(4\omega x) = a + \frac{b}{8} \sin(8\omega x)$

$\frac{1}{2}\sin(2\omega x)$

$\frac{1}{4}\sin(4\omega x)$

$T = \frac{\pi}{\omega} = \frac{\pi}{10} = \frac{4\pi}{10} = \frac{2\pi}{5}$

$\frac{2\pi}{4\omega} = \frac{2\pi}{\omega}$

$\boxed{\omega = \frac{5}{2}}$

$a + |\frac{b}{8}| = 4 \quad 2a = 4 \quad a = 2$

$a - |\frac{b}{8}| = 0 \quad b = \pm 16$

$\frac{bc}{a} = \frac{16\omega}{4\pi}$

(۹)

$f(x) = a\cos bx + c \qquad T = \pi = \frac{2\pi}{b} \rightarrow b = 2$

$|a| + c = 2 \Rightarrow 2c = -2 \quad c = -1$

$c - |a| = -4 \qquad a = \pm 3 \quad -2 \quad f(x) = -2\cos 2x - 1 = 0$

$(\tan\alpha)^2 = 2 \Rightarrow \tan\alpha = \sqrt{2} \qquad +0.25 \qquad \frac{1}{\cos 2x} - 1 \qquad \cos 2x = -\frac{1}{3}$

$\tan\alpha$

(۱۰)

$f(-2.4, 0) = f(+1, 0)$

$y = -\frac{1}{2}x + 1 \rightsquigarrow f(\xi) = -\frac{1}{2} + 1 = \frac{1}{4}$

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