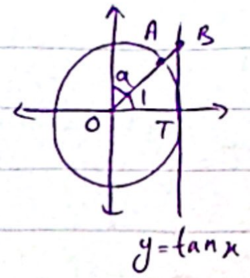
عربی



(۱

AB ?

$BT = \tan \hat{O}_1 \xrightarrow{\hat{O}_1 + \alpha = 90} BT = \cot\alpha$

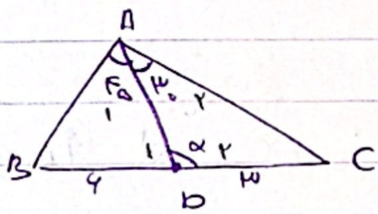
$\overset{\triangle}{OBT} : \hat{T} = 90 \to OT^2 + BT^2 = OB^2$

$\xrightarrow{OT=1} 1+\cot^2\alpha = OB^2 \to$

$OB^2 = \frac{1}{\sin^2\alpha} \to OB = \frac{1}{\sin\alpha}$

$OB = OA + AB \xrightarrow{OA=1}$

$\frac{1}{\sin\alpha} = 1 + AB \to AB = \frac{1-\sin\alpha}{\sin\alpha}$



(۲

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

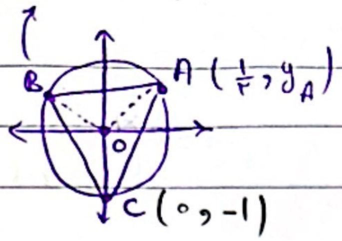
قضیهٔ سینوس ها در $\overset{\triangle}{ABD}$: $\frac{BD}{\sin\hat{A}_1} = \frac{AB}{\sin\hat{D}_1}$

$\xrightarrow[\sin(\hat{D}_1)=\sin(180-\hat{D}_2)=\sin\hat{D}_2]{\hat{D}_1+\hat{D}_2=180} \frac{6}{\frac{\sqrt{2}}{2}} = \frac{AB}{\sin\hat{D}_2} \to AB = 6\sqrt{2}\sin\hat{D}_2$

قضیهٔ سینوس ها د $\overset{\triangle}{ADC}$: $\frac{DC}{\sin\hat{A}_2} = \frac{AC}{\sin\hat{D}_2} \to AC = 6\sin\hat{D}_2$

جواب : $\frac{AB}{AC} = \frac{6\sqrt{2}\cancel{\sin\hat{D}_2}}{6\cancel{\sin\hat{D}_2}} = \sqrt{2}$

$(x_B , \frac{1}{۲})$



(۳

الف)

$A(\frac{1}{۲} , y_A) \rightarrow \cos\hat{A} = \frac{1}{۲}$

$\xrightarrow{\text{زاویه } A} y_A = \sin A = \frac{\sqrt{۳}}{۲}$

$B(x_B , \frac{1}{۲}) \rightarrow \sin\hat{B} = \frac{1}{۲} \xrightarrow{\text{زاویه } B} x_B = \cos B = \frac{-\sqrt{۳}}{۲}$

$$S_\Delta = \frac{1}{۲}\begin{vmatrix} x_A & y_A & 1 \\ x_B & y_B & 1 \\ x_C & y_C & 1 \end{vmatrix} = \frac{1}{۲}\begin{vmatrix} \frac{1}{۲} & \frac{\sqrt{۳}}{۲} & 1 \\ -\frac{\sqrt{۳}}{۲} & \frac{1}{۲} & 1 \\ ۰ & -1 & 1 \end{vmatrix} = \frac{\sqrt{۳}+۳}{۴}$$

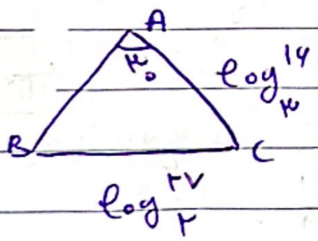
ب)

$AB = \sqrt{(x_A - x_B)^۲ + (y_A - y_B)^۲} = \sqrt{۲}$

$AC = \sqrt{(x_A - x_C)^۲ + (y_A - y_C)^۲} = \sqrt{۲ + \sqrt{۳}}$

$BC = \sqrt{(x_B - x_C)^۲ + (y_B - y_C)^۲} = \sqrt{۳}$

محیط $= \sqrt{۳} + \sqrt{۲} + \sqrt{۲ + \sqrt{۳}}$



$S_\Delta = ?$

(۴

طبق قانون سینوس ها: $\frac{BC}{\sin A} = \frac{AC}{\sin B} \rightarrow \frac{\log_{۲}^{۲۷}}{\frac{1}{۲}} = \frac{\log_{۳}^{۱۶}}{\sin B}$

$\sin B = \frac{۴\log_{۳}^{۲}}{۲ \times ۳\log_{۲}^{۳}}$

s.a.m

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$x - \cos\alpha = 0 \rightarrow x = \cos\alpha \longrightarrow$ ۵_

$2\cos^4\alpha - \cos^2\alpha - 2\sin^4\alpha + \sin^2\alpha = 1$

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

$2(\cos^2\alpha - \sin^2\alpha)(\underbrace{\cancel{\cos^2\alpha + \sin^2\alpha}}_{1}) + -(\cos^2\alpha - \sin^2\alpha) = 1$

$2\cos^2\alpha - 2\sin^2\alpha - \cos^2\alpha + \sin^2\alpha = 1$

$\cos^2\alpha - \sin^2\alpha = 1$

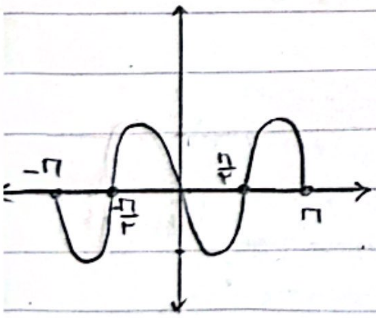
$\cos 2\alpha = 1 \rightarrow \sin 2\alpha = 0$

۶_

الف)

$[-\pi, \pi]$

$y = -2\sin x\cos x + 2 = 2 - \sin 2x \qquad T = \frac{2\pi}{|a|} = \frac{2\pi}{2} = \pi$

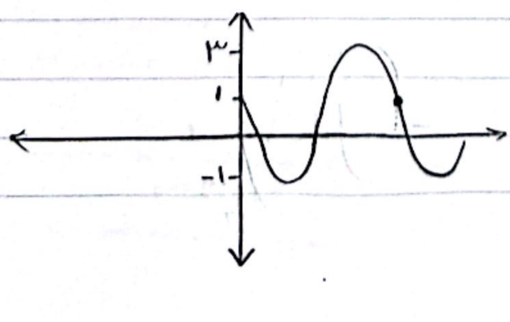


ب)

$[-\pi, 2\pi]$

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

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



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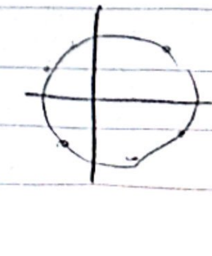

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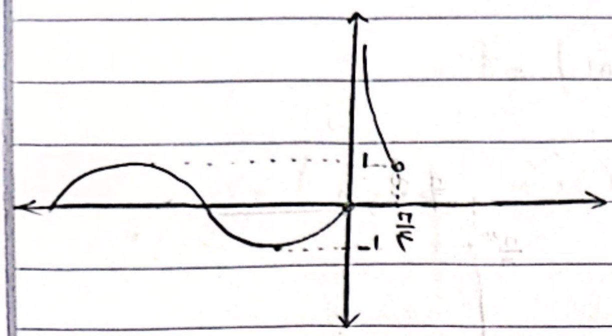
$$f(x) = \begin{cases} \cot x & 0 < x < \frac{\pi}{4} \\ \sin x & x \leq 0 \end{cases}$$ — 7



$\rightarrow R_{f(x)} = [-1, +\infty)$

$$f(x) = a + b \overset{\times 2}{\,} \frac{\sin(cx)\cos(cx)}{2}\cos(2cx) =$$ — 8

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

s.a.m