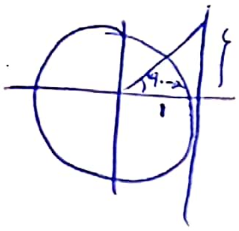
دوازدهم ریاضی   تکلیف ۱۴   ۱۸٫۷۵   نسرین نکوئی

۱-



$\tan(\frac{\pi}{2}-\alpha)$

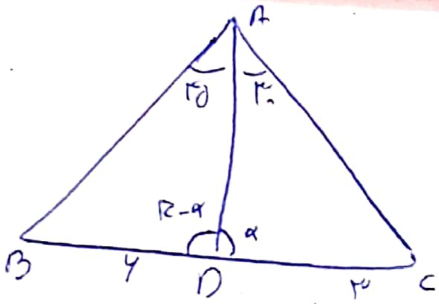
$OB^2 = BT^2 + OT^2$ $\qquad \tan(\frac{\pi}{2}-\alpha) = \cot\alpha$

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

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

$AB = \frac{1}{\sin\theta} - 1 = \frac{1-\sin\theta}{\sin\theta}$ ✓ ۴

۲-



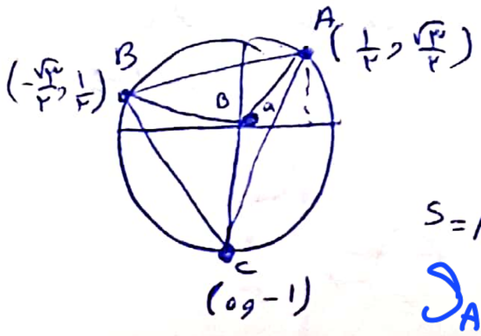
$\frac{\sin A}{a} = \frac{\sin B}{b}$

$\frac{\frac{\sqrt{2}}{2}}{6} = \frac{\sin\alpha}{AB} \rightarrow \frac{\sqrt{2}}{12} = \frac{\sin\alpha}{AB} \rightarrow AB = \frac{12\sin\alpha}{\sqrt{2}}$

$\frac{\frac{1}{2}}{3} = \frac{\sin\alpha}{AC} \qquad \frac{1}{6} = \frac{\sin\alpha}{AC} \rightarrow AC = 6\sin\alpha$

$\frac{AB}{AC} = \frac{\frac{12\sin\alpha}{\sqrt{2}}}{6\sin\alpha} = \frac{12}{6\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}} = \sqrt{2}$ ✓ ۲

۳- الف)



$\cos\alpha = \frac{1}{2} \rightarrow \alpha = 30$

$\sin B = \frac{1}{2} \rightarrow B = 150$

$O_1 = 150 - 30 = 120$

$S = AC \times BC \times \sin\hat{C} \times \frac{1}{2} = \sqrt{2+\sqrt{3}} \times \sqrt{3} \times \frac{\sqrt{3}}{2} \times \frac{1}{2} = \frac{3\sqrt{2+\sqrt{3}}}{4}$

$S_{ABC} = \frac{1}{4} + \frac{1}{4} + \frac{\sqrt{3}}{4} = \frac{2+\sqrt{3}}{4}$

$AB = \sqrt{(\frac{1}{2}+\frac{\sqrt{3}}{2})^2 + (\frac{\sqrt{3}}{2}-\frac{1}{2})^2} = \sqrt{\frac{1}{4}+\frac{3}{4}+\frac{1}{4}+\frac{3}{4}} = \sqrt{2}$ (ب

$AC = \sqrt{(\frac{1}{2})^2 + (\frac{\sqrt{3}}{2}+1)^2} = \sqrt{\frac{1}{4}+\frac{3}{4}+1+\sqrt{3}} = \sqrt{2+\sqrt{3}}$

$BC = \sqrt{(\frac{\sqrt{3}}{2})^2 + (\frac{1}{2}+1)^2} = \sqrt{\frac{3}{4}+\frac{9}{4}} = \sqrt{3}$

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

۱٫۷۵

۴ـ

$S_{ABC} = \frac{1}{2} \times AB \times AC \times \sin\alpha = \frac{1}{2}\log_2^{27} \times \log_{12}^{16} \times \frac{1}{2}$

$\frac{1}{4} \times 3\log_2^{3} \times 4\log_{12}^{2} = 3$

(۲)

۵ـ

$2x^4 - x^2 - \sin 2\alpha(\underbrace{2\sin^2\alpha - 1}_{-\cos 2\alpha}) \xrightarrow[x=\cos\alpha]{x-\cos\alpha=0} \underbrace{2\cos^4\alpha - \cos^2\alpha}_{\cos^2\alpha(2\cos^2\alpha-1)(\cos 2\alpha)} + \sin 2\alpha\cos 2\alpha = 1$

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

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

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

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

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

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

(۲)

$\cos 2\alpha = 1$

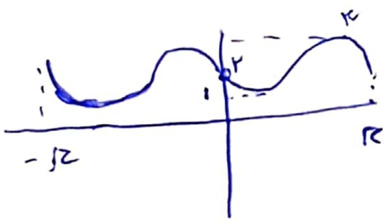
$\cos^2 2\alpha + \sin^2 2\alpha = 1$

$\sin 2\alpha = 0$

۶ـ

الف) $T = \frac{2\pi}{|b|} = \frac{2\pi}{|2|} = \pi$

$-2\sin x\cos x + 2 = -\sin 2x + 2$

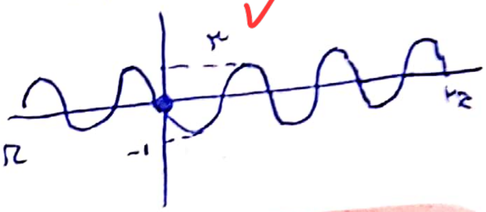


(۲)

ب) $2\cos(\pi x + \frac{\pi}{2}) + 1$

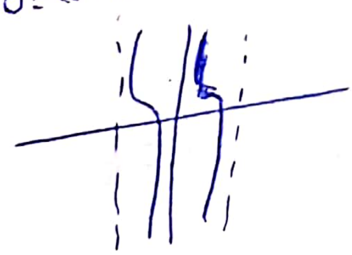
ب) $= -2\sin(\pi x) + 1$

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

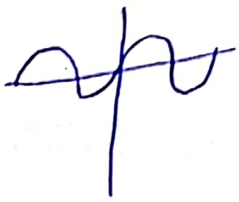


۷ـ ابتدا نمودار را [illegible] و سپس
[illegible]

$y = \cot x$



$y = \sin x$



=> با در نظر گرفتن دامنه

$\cot\frac{\pi}{4} = 1$

(۱٫۵)

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

۸-

$$f(x) = a + b\sin(cx)\cos(cx)\cos(2cx)$$

$$\frac{1}{2}\sin 2cx \qquad \frac{1}{2}\sin 4cx$$

$$f(x) = a + \frac{b}{4}\sin 4cx$$

(۱٫۵)

$$T = \frac{2\pi}{|b|} = \frac{2\pi}{|4c|} \Rightarrow \frac{\pi}{2} = \frac{2\pi}{|4c|} \rightarrow |4c| = 8$$

(دوره تناوب مثبت)

$$c = \frac{5}{4}, -\frac{5}{4} \rightarrow c > 0 \quad c = \frac{5}{4}$$

$a =$ میانگین $\Rightarrow a = \frac{Max + Min}{2} = \frac{4+0}{2} = 2 \rightarrow a = 2$

(۵)

$$Max - Min = 4 \rightarrow |b| = 2 \xrightarrow{c>0} b = -2$$

$$b = 8$$

$$\frac{bc}{a} = \frac{-2 \times \frac{5}{4}}{2} = -\frac{5}{4}$$

۹-

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

چون $\cos 2x$ است ← زوج است

$$f(x) = -4\cos^2 x - 1$$

$$-4\cos^2 x - 1 = 0$$

$$\cos^2 x = \frac{1}{4} \rightarrow \cos^2 2\alpha = \frac{1}{9}$$

$$1 + \tan^2 2\alpha = \frac{1}{\cos^2 2\alpha}$$

$$\frac{1}{9}$$

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

$$|a| + c = 2$$

$$-|a| + c = -4 \rightarrow 2c = -2 \quad c = -1$$

$$|a| - 1 = 2$$

$$|a| = 3$$

$a = -3$ چون برعکس است.

(۴)

۱۰-

$$T = 4\pi \rightarrow f(x) = f(x + 4k\pi) \xrightarrow{k\in\mathbb{Z}} f(-4\pi, 5) = f(1, 5) = \frac{1}{4}$$

$$0 < x < 2 \rightarrow y = -\frac{1}{2}x + 1 \Rightarrow f\left(\frac{4}{3}\right) = -\frac{1}{2} \times \frac{4}{3} + 1 = \frac{1}{3}$$

(۲)