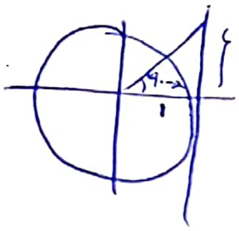
دوازدهم ریاضی ۴ تکلیف ۱۴ نسرین نکویی

۱-



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

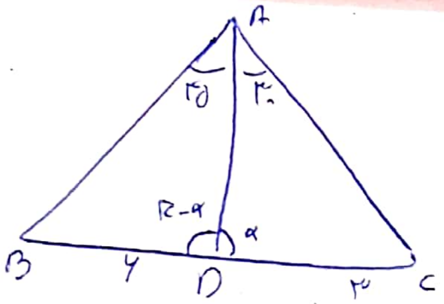
$$OB^2 = BT^2 + OT^2 \qquad \tan\left(\frac{\pi}{2}-\alpha\right) = \cot\alpha$$

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

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

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

۲-



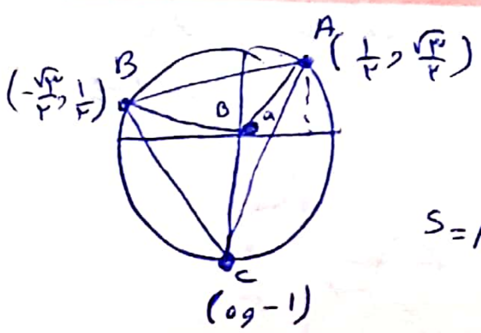
$$\frac{\sin A}{a} = \frac{\sin B}{b}$$

$$\frac{\frac{\sqrt{2}}{2}}{\frac{6}{1}} = \frac{\sin\alpha}{AB} \rightarrow \frac{\sqrt{2}}{12} = \frac{\sin\alpha}{AB} \rightarrow AB = \frac{12\sin\alpha}{\sqrt{2}}$$

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

$$\frac{AB}{AC} = \frac{\frac{12\sin\alpha}{\sqrt{2}}}{\frac{6\sin\alpha}{1}} = \frac{12}{6\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}} = \sqrt{2}$$

۳-



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

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

$$\alpha_1 = 150 - 30 = 120$$

الف)

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

ب)

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

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

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

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

۴-

$S_{ABC} = \frac{1}{2} \times AB \times AC \times \sin\alpha = \frac{1}{2} \log_2^{32} \times \log_{16}^{16} \times \frac{1}{2}$

$\frac{1}{4} \times 5 \log_2^{2} \times (\log_{16}^{16} = \frac{5}{4}$

۵-

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

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

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

$\cos 2\alpha = 1$

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

$\sin 2\alpha = 0$

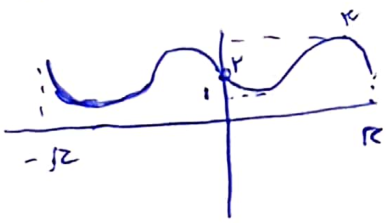
$2\sin^2\alpha - 1 = 2\sin^2\alpha - \sin^2\alpha - \cos^2\alpha$
$= \sin^2\alpha - \cos^2\alpha$

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

۶-

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

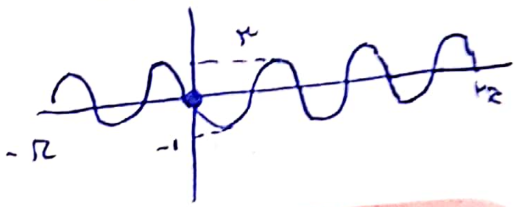
$-2\sin x \cos x + 2 = -\sin 2x + 2$



ب) $2\cos(\pi x + \frac{\pi}{2}) + 1$

ب) $= -2\sin(\pi x + 1)$

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



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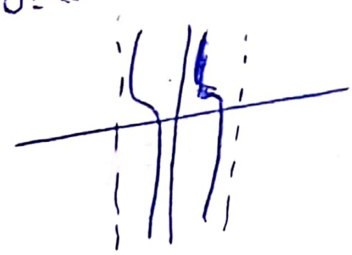
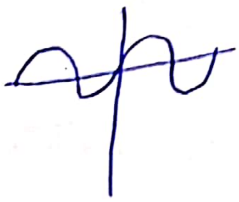
۷ - انتقال نمودار را صرفاً به بالا ببریم

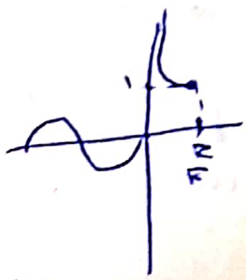
$y = \cot x$



$y = \sin x$



=> با در نظر گرفتن دامنه



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

۸-

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

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

$$T = \frac{2\pi}{|b|} = \frac{2\pi}{|4c|} \Rightarrow \frac{4\pi}{10} = \frac{2\pi}{|4c|} \to |4c| = 5$$

در رابطه فرمول

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

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

$$Max - Min = 4 \to |b| = 2 \xrightarrow{bc<0} b = -2 \qquad \frac{bc}{a} = \frac{-2\times\frac{5}{4}}{2} = -\frac{5}{4}$$

۹-

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

چون $\cos bx$ است ← فرقی ندارد.

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

$$|a| - 1 = 2$$
$$|a| = 3$$
$$a = -3$$ چون برعکس است.

$$f(x) = -3\cos 2x - 1$$
$$-3\cos 2x - 1 = 0$$
$$\cos 2\alpha = -\frac{1}{3} \to \cos^2 2\alpha = \frac{1}{9}$$
$$1 + \tan^2 2\alpha = \frac{1}{\underbrace{\cos^2 2\alpha}_{\frac{1}{9}}}$$
$$\Rightarrow |\tan 2\alpha| = 2\sqrt{2}$$

۱۰-

$$T = 3 \to f(x) = f(x + 3k) \to f(-24.5) = f(1.5) = \frac{1}{4}$$
$$k \in \mathbb{Z}$$

$$\to 0 \le x < 2 \to y = -\frac{1}{2}x + 1 \Rightarrow f(\tfrac{3}{2}) = -\frac{1}{2}\times\frac{3}{2} + 1 = \frac{1}{4}$$