۱۸/۵

صالح ذوالنوری — بنام آنکه جان را فکرت آموخت — کلاس ۱۱ - دوازدهم B

شیب $= \tan \hat{1} = \cot\alpha \rightarrow y = \cot\alpha \cdot x \Rightarrow A\left|\begin{matrix}\cos \hat{1} \\ \sin \hat{1}\end{matrix}\right. \Rightarrow A\left|\begin{matrix}\sin\alpha \\ \cos\alpha\end{matrix}\right. , B\left|\begin{matrix}1 \\ \cot\alpha\end{matrix}\right.$ ① ۱/۵

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

$$\sqrt{\frac{\sin^4\alpha + \sin^2\alpha - 2\sin^3\alpha + \cos^2\alpha - \cos^2\alpha\sin^2\alpha - 2\cos^2\alpha\sin\alpha}{\sin^2\alpha}} = \sqrt{\frac{\ldots - 2\sin(\sin^2 + \cos^2) - \cos^2\sin^2}{\sin^2}}$$

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

$$\sqrt{\frac{\sin^4\alpha - \sin^2\alpha - 2\sin\alpha + 1}{\sin^2\alpha}}$$

$$\left.\begin{matrix}\frac{\sin 45^\circ}{4} = \frac{\sin\alpha}{AB} \\ \frac{\sin 30^\circ}{3} = \frac{\sin\alpha}{AC}\end{matrix}\right\} \div \frac{AC}{AB} = \frac{\frac{\sqrt{2}}{2}}{2 \times \frac{1}{2}} \rightarrow \frac{AB}{AC} = \frac{2}{\sqrt{2}} \rightarrow \frac{\sqrt{2}}{2} \checkmark \quad \Big| \quad D_1 = \alpha \rightarrow D_2 = 180 - \alpha \rightarrow \sin\hat{D}_1 = \sin\hat{D}_2$$ ② ۲

$$A = \frac{\pi}{3} \Rightarrow AB = \sqrt{\left(\frac{\sqrt{3}}{2} - \frac{1}{2}\right)^2 + \left(\frac{\sqrt{3}}{2} - \frac{1}{2}\right)^2} = \frac{\sqrt{3} - 1}{2} \times \sqrt{2}$$ ③ ۱

$B = \frac{5\pi}{4}$

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

۴)

$S_\Delta = \frac{1}{2} \times AB \times AC \times \sin\alpha = \frac{1}{2} \times \log_2^{3^3} \times \log_3^{2^4} \times \frac{1}{2} = \frac{1}{4} \times 3 \times 4 \times 1 = 3$ ۲

$\log_3^2 = \frac{1}{\log_2^3}$

۵)

$\frac{2\cos^4\alpha - \cos^2\alpha - (\sin^2\alpha \times (2\sin^2\alpha - 1))}{\cos^4\alpha + \cos^2\alpha} = 1 \to$ طبق نکته داریم: ۲

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

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

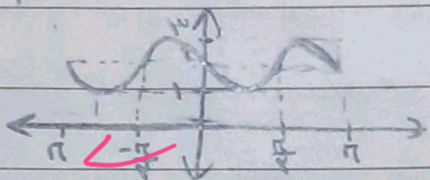
$(1 - \sin^2\alpha) = \cos^2\alpha$

$= \cos^2\alpha - \sin^2\alpha = \cos 2\alpha = 1 \to \sin 2\alpha = 0$

۶) الف)

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

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

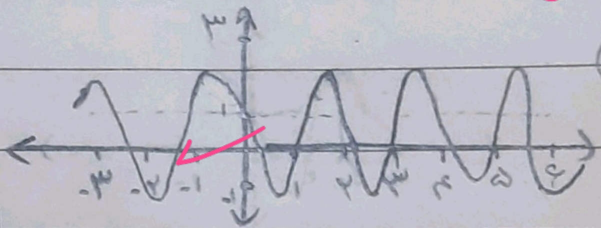


۲

ب)

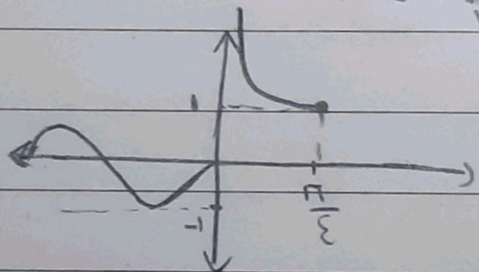
$y = 2\cos(\pi x + \frac{\pi}{2}) + 1 = -2\sin(\pi x) + 1$

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



۷)

$f(x) \begin{cases} \cot x : 0 < x \le \frac{\pi}{4} \\ \sin x : x \le 0 \end{cases}$



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

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

$\sin 0 = 0$

۸)

$f(x) = a + \frac{b}{2}\sin(2cx)\cos(2cx) = a + \frac{b}{4}\sin(4cx) \,,\ T = \frac{\pi}{2} - \frac{\pi}{10} = \frac{4\pi}{10} = \frac{2\pi}{4c}$

$\to c = \frac{5}{4} \,,\ max - min = 4$ در برابر حالت اصلی $\to \frac{b}{4} = 2 \to b = 8$ ۲

min → باید ۰ می‌بود → $a = 2$ → $\frac{b \times c}{a} = 8 \times \frac{5}{4} \times \frac{1}{2} = \frac{5}{2}$

ولی ۲ تا بالا آمده و صفر شده

۹)

$T = \frac{2\pi}{|b|} = \pi \to |b| = 2 \to b = 2 \,,\ max - min = 6 = 2|a| \to |a| = 3$ → قرینه شده، عدد

b مثبت به خاطر شکل نمودار

max → باید ۳ می‌بود → ۱- واحد پایین آمده → $c = -1 \,,\ a = -3$ ۲

$f(x) = -3\cos(2x) - 1 \to -3\cos(2\alpha) - 1 = 0 \to \cos(2\alpha) = -\frac{1}{3}$

$1 + \tan^2 x = \frac{1}{\cos^2 x} \to \tan^2(2\alpha) = \frac{1}{\frac{1}{9}} - 1 = 8 \to |\tan 2\alpha| = 2\sqrt{2}$

سوال ۱

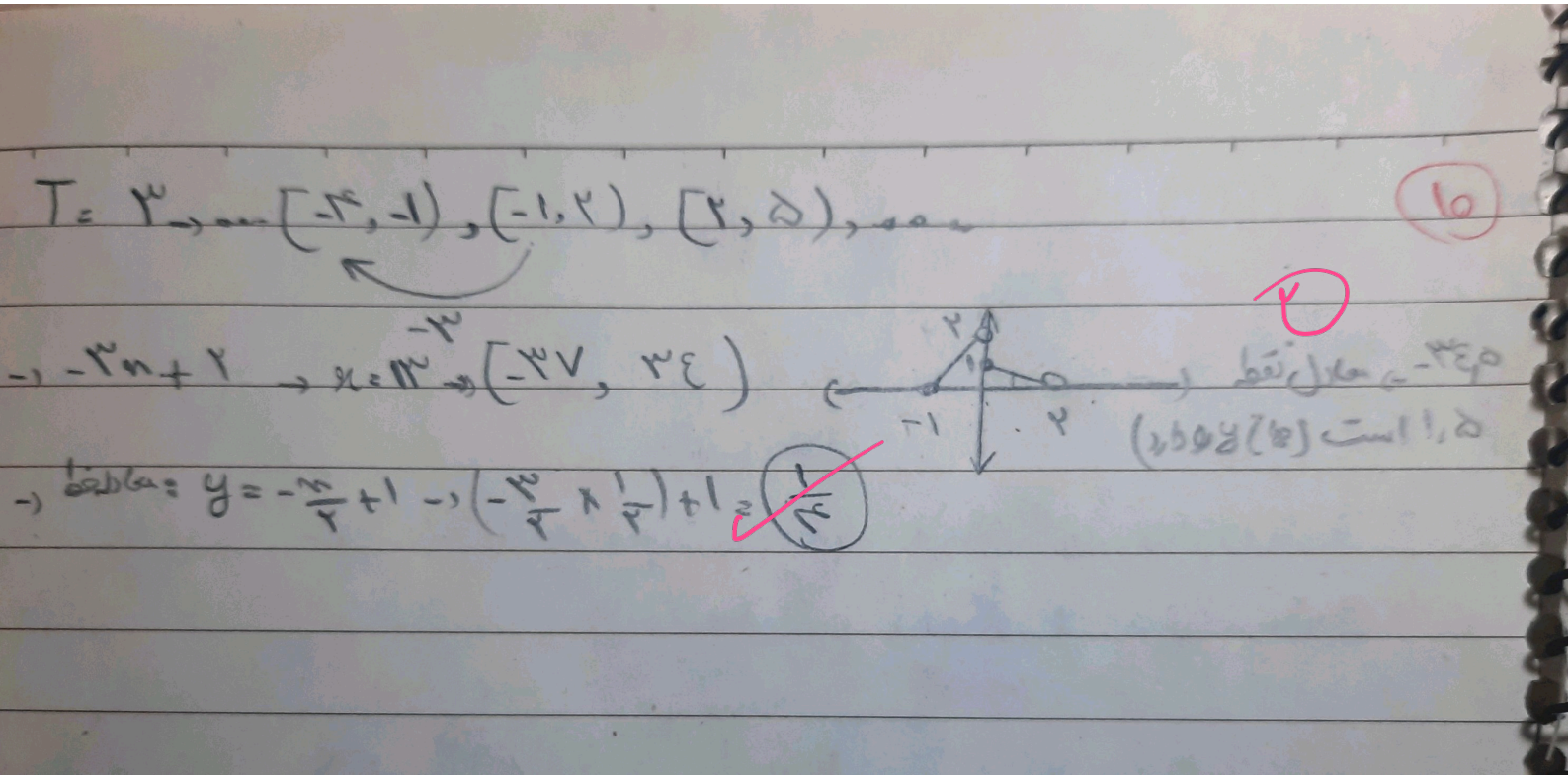
$BT = \tan(\frac{\pi}{2} - \alpha) = \cot\alpha$ شعاع‌های دایره هستند OA و OT

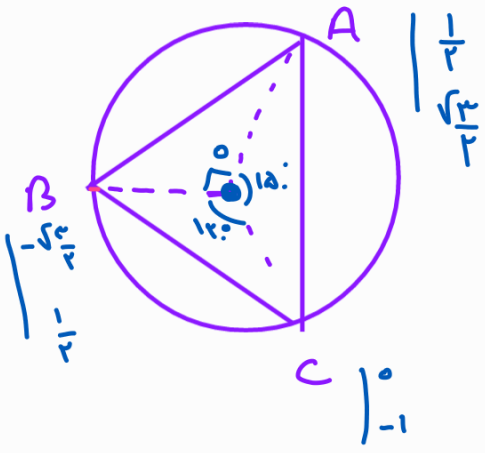
وطول آنها یک است.

$OB^2 = OT^2 + BT^2 \rightarrow OB^2 = 1^2 + \cot^2\alpha \rightarrow OB^2 = 1 + \cot^2\alpha$

$OB^2 = \frac{1}{\sin^2\alpha} \rightarrow OB = \frac{1}{|\sin\alpha|}$ α حاده است $\rightarrow OB = \frac{1}{\sin\alpha}$

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





$S_{AOC} = 1 \times 1 \times \frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$

$S_{OAB} = 1 \times 1 \times \frac{1}{2} = \frac{1}{2}$

$S_{OBC} = 1 \times 1 \times \frac{1}{2} \times \frac{\sqrt{3}}{2} = \frac{\sqrt{3}}{4}$

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

$BC^2 = 1^2 + 1^2 - 1 \times 1 \times 2 \times -\frac{1}{2} = 1+1+1 = 3 \rightarrow BC = \sqrt{3}$

$AC^2 = 1^2 + 1^2 - 1 \times 1 \times 2 \times -\frac{\sqrt{3}}{2} = 1+1+\sqrt{3} \rightarrow AC = \sqrt{2+\sqrt{3}}$

$AB^2 = 1^2 + 1^2 \rightarrow AB = \sqrt{2}$

$P_{ABC} = \sqrt{2} + \sqrt{3} + \sqrt{2+\sqrt{3}}$