به نام خدا
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تکلیف ۱۵ — دوازدهم تجربی ۵

۱۹٫۷۵ آفرین

۱- ۲

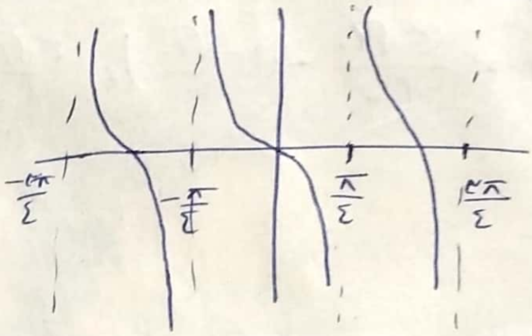
$$y = \tan\left(-2x + \frac{\pi}{4}\right) = -\tan\left(2x - \frac{\pi}{4}\right)$$

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

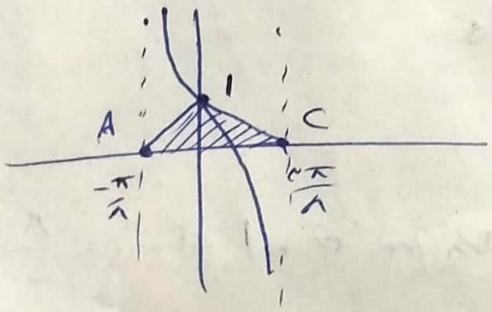
فاصله بین A و C برابر یک دوره تناوب است پس: $AC = \frac{\pi}{2}$

$$f(0) = -\tan\left(-\frac{\pi}{4}\right) = 1 \Rightarrow B|1$$

$$S = \frac{\frac{\pi}{2} \times 1}{2} = \boxed{\frac{\pi}{4}}$$



$$y = -\tan 2\left(x - \frac{\pi}{8}\right) = -\tan\left(2x - \frac{\pi}{4}\right)$$



۳- ۲

$$x^2 - (\sin\alpha)x - \frac{1}{4}\cos^2\alpha = 0$$

$$x = \frac{-b \pm \sqrt{\Delta}}{2a} = \frac{\sin\alpha \pm \sqrt{\sin^2\alpha + \cos^2\alpha}}{2} = \frac{\sin\alpha \pm 1}{2}$$

$$\frac{\sin\alpha + 1}{2} = \frac{2}{3} \Rightarrow \boxed{\sin\alpha = \frac{1}{3}} \Rightarrow \cos^2\alpha = 1 - \sin^2\alpha = \frac{8}{9}$$

$$\frac{\sin\alpha - 1}{2} = \frac{2}{3} \Rightarrow \sin\alpha = \frac{7}{3}$$ غ‌ق‌ق

$$\Rightarrow \boxed{1 + \tan^2\alpha = \frac{1}{\cos^2\alpha} = \frac{9}{8}}$$

۳-

$\log \sin t - \log(-\cos t) = \log 3$

$\Rightarrow \log \dfrac{-\sin t}{\cos t} = \log 3 \Rightarrow \dfrac{-\sin t}{\cos t} = 3 \Rightarrow \tan t = -3$

$\sin t > 0 \;]\; II$

$-\cos t > 0 \Rightarrow \cos t < 0 \;]\; I$

با توجه به دامنه log داریم: ۲

$\cos^2 t = \dfrac{1}{1+\tan^2 t} = \dfrac{1}{10} \overset{I}{\Rightarrow} \cos t = \dfrac{-\sqrt{10}}{10}$

$\sin^2 t = 1 - \cos^2 t = \dfrac{9}{10} \overset{II}{\Rightarrow} \sin t = \dfrac{3\sqrt{10}}{10}$

$\Rightarrow \sin t - \cos t = \dfrac{3\sqrt{10}}{10} - \left(-\dfrac{\sqrt{10}}{10}\right) = \dfrac{4\sqrt{10}}{10} = \dfrac{2\sqrt{10}}{5}$ ✓

۴-

$\sin^4\theta + \cos^2\theta = \dfrac{4}{5}$

$\sin^4\theta + 1 - \sin^2\theta = \dfrac{4}{5} \Rightarrow \sin^4\theta - \sin^2\theta = -\dfrac{1}{5}$

$\Rightarrow \sin^2\theta(\sin^2\theta - 1) = -\sin^2\theta\cos^2\theta = -\dfrac{1}{5}$ ۲

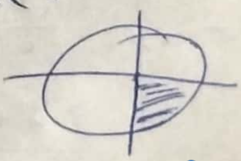
$\Rightarrow \boxed{\sin^2\theta\cos^2\theta = \dfrac{1}{5}}$ ✓

$\cos^4\theta + \sin^2\theta + \underbrace{\sin^4\theta + \cos^2\theta}_{\frac{4}{5}} = 1 - 2\sin^2\theta\cos^2\theta + 1 = 2 - \dfrac{2}{5} = \dfrac{8}{5}$

$\Rightarrow \cos^4\theta + \sin^2\theta = \dfrac{8}{5} - \dfrac{4}{5} = \dfrac{4}{5}$

۵- ۱٫۷۵

$\dfrac{3\sin x + \sin x\cos x}{2 - 2\cos^2 x} = \dfrac{\sin x\overbrace{(3+\cos x)}^{+}}{\underbrace{2\sin^2 x}_{+}} < 0 \Rightarrow \sin x < 0$



صورت سوال را با دقت بنویس! :) $(\sin x \neq 0)$ -

$\sin x \tan x - \dfrac{1}{\cos x} = \dfrac{\sin^2 x - 1}{\cos x} = \dfrac{\overbrace{-\cos^2 x}^{+}}{\cos x} > 0 \Rightarrow \cos x > 0$

$\cos x < 0$

ربع سوم

$$\frac{r}{\sin\alpha} + \frac{r}{\cos\alpha} = \frac{r\cos\alpha + r\sin\alpha}{\sin\alpha\cos\alpha} = 0 \Rightarrow r\cos\alpha + r\sin\alpha = 0$$

$$r\cos\alpha = -r\sin\alpha \Rightarrow \frac{\sin\alpha}{\cos\alpha} = \tan\alpha = \frac{r}{-r}$$

$$\Rightarrow \cot\alpha = -\frac{r}{r}$$

$$\tan\alpha + \cot\alpha = -\frac{r}{r} - \frac{r}{r} = \frac{-5-9}{5} = \frac{-14}{5}$$

$$\frac{\sqrt{1+\sin\theta}}{\sin\theta + \sin 10} = \frac{\sqrt{1+\cos 5\theta}}{\sin(70+20) + \sin(70-20)}$$

$$= \frac{\sqrt{2}\cos 20}{\sin 70\cos 20 + \cos 70\sin 20 + \sin 70\cos 20 - \cos 70\sin 20} = \frac{\sqrt{2}\cos 20}{2\sin 70\cos 20}$$

$$= \frac{\sqrt{2}}{2\sin 70} = \frac{\sqrt{2}}{2\cdot\frac{1}{2}} = \sqrt{2}$$

$$(1-2\sin^2\theta)(2\cos^2 10 - 1)\left(\frac{1-\tan^2 20}{1+\tan^2 20}\right)$$

$$= \cos 10 \cdot \cos 20 \cdot \cos 40 = \frac{\sin 10\cdot\cos 10\cdot\cos 20\cdot\cos 40}{\sin 10}$$

$$= \frac{\frac{1}{8}\sin 80}{\sin 10} = \frac{\frac{1}{8}\cos 10}{\sin 10} = \frac{1}{8}\cot 10$$

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

$$\Rightarrow 10\cos^2\alpha - 4\cos\alpha + c = 0 \Rightarrow 10\cos^2\alpha - 4\cos\alpha - 8 = -8$$

$$A+B+C = \pi \Rightarrow A = \pi - (B+C)$$

$$8(2\cos^2\alpha - 1) - 4\cos\alpha = 16\cos^2\alpha - 4\cos\alpha = -8$$

$$\cos^2\frac{A}{2} = \frac{1+\cos A}{2} = \frac{1+\cos(\pi-(B+C))}{2}$$

$$= \frac{1-\cos(B+C)}{2} = \sin B\sin C \Rightarrow 1 - (\cos B\cos C - \sin B\sin C) = 2\sin B\sin C$$

$$\Rightarrow 1 = \sin B\sin C + \cos B\cos C = \cos(B-C) \Rightarrow B = C$$

$$\Rightarrow A = 180 - 2B = 60$$