بسم رب الذی خلق المهدی

Date: ۲۸ — Subject: ستایش عراقی زاده

۱۵

۱)

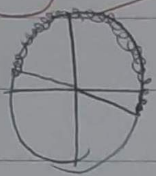
$$\frac{\cos\alpha}{\sin\alpha} = \frac{\cos\alpha}{|\sin\alpha|} \Rightarrow \sin\alpha > 0$$

$\boxed{\text{ناحیه اول}}$

$$\frac{1}{|\cos\alpha|} - \frac{\sin\alpha}{\cos\alpha} = \frac{1-\sin\alpha}{|\cos\alpha|} \Rightarrow \cos\alpha > 0$$

۲)

$$-\frac{\pi}{6} < 2x < \frac{5\pi}{6}$$



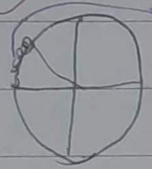
$$-\frac{2\pi}{12} < 2x < \frac{2\times 5\pi}{12}$$

$$-\frac{1}{2} < \sin 2x \le 1 \Rightarrow -\frac{1}{2} < \frac{m-1}{4} \le 1 \Rightarrow -2 < m-1 \le 4$$

$$\boxed{-1 < m \le 5}$$

۳)

$$\frac{3\pi}{4} < x < \pi$$



$\sin x + \cos x < 0$

$$\frac{1}{\sin x + \cos x} = -3$$

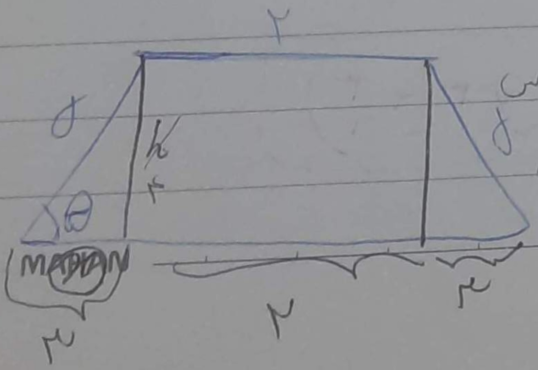
$$\boxed{\sin x \cos x = -\frac{1}{3}}$$

$$\frac{1}{(\sin x+\cos x)(\sin^2 x+\cos^2 x - \sin x\cos x)}$$

$$(\sin x + \cos x)^2 = 1 - \frac{2}{3} = \frac{1}{3} \Rightarrow \sin x + \cos x = -\sqrt{\frac{1}{3}}$$

$$\frac{1}{\left(-\frac{\sqrt{3}}{3}\right)\left(\frac{4}{3}\right)} = -\frac{9}{4\sqrt{3}} = \frac{-3\sqrt{3}}{4}$$

۴)




$$\frac{h}{5} = \sin\theta = \frac{4}{5} \Rightarrow \boxed{h=4}$$

فیثاغورس $\Rightarrow \boxed{x=3}$

قاعده بزرگ $= 3+2+3 = 8$

$$S = \frac{1}{2}\times 4\times(8+2) = 20$$

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$\tan(\frac{3\pi}{2}+\alpha)\tan(-\pi+\alpha) - \sin(4\pi+\alpha)\cos(\frac{3\pi}{2}-\alpha)$ $(\alpha=15)$ ۵

$(-\cot\alpha)\times(\tan\alpha) - (\sin\alpha)(-\sin\alpha)$ ۶

$-1+\sin^2\alpha = -\cos^2\alpha \Rightarrow \boxed{x=-1}$

$(\alpha=27)$ ۶

$\sqrt{3}\times(-\frac{\sqrt{3}}{2})\times(\underbrace{\sin(\frac{3\pi}{2}-\alpha)}_{-\cos\alpha}) - \sqrt{2}\times\frac{\sqrt{2}}{2}\times(\underbrace{\cos(\pi-\alpha)}_{-\cos\alpha})$ ۰/۵

$+\frac{3}{2}\cos\alpha + \frac{1}{2}\cos\alpha = 2\cos\alpha$ ۲ برابر

$16\cos^2(\frac{\pi}{12})(\cos^2\frac{\pi}{4})(\cos^2\frac{\pi}{3})(\cos^2\frac{2\pi}{3})$ ۷

$\frac{1}{4}\sin^2\frac{\pi}{3} = \cos^2\frac{2\pi}{3}$ $\xrightarrow[\frac{\pi}{4}]{\text{متمم}} \sin^2\frac{\pi}{4}$ ۰/۵

$\cos^2\frac{\pi}{12} = \frac{1+\cos\frac{\pi}{6}}{2}$

$16(\cos^2\frac{\pi}{4}\sin^2\frac{\pi}{4})\times(\cos^2\frac{\pi}{12})(\sin^2\frac{2\pi}{3})$

$\frac{1}{4}\sin^2\frac{\pi}{2}$

$\cos^2\frac{\pi}{12} = \frac{2+\sqrt{3}}{4}$

$4\times(\cos^2\frac{2\pi}{3})(\sin^2\frac{2\pi}{3})(\cos^2\frac{\pi}{12})$

$4(\sin^2\frac{4\pi}{3})(\cos^2\frac{\pi}{12})$

$4(-\frac{\sqrt{3}}{2})(\frac{2+\sqrt{3}}{4})$

$-\sqrt{3}-\frac{3}{2} = \boxed{-(\sqrt{3}+\frac{3}{2})}$

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$$\frac{1-\sin x}{1+\sin x} = 4 \qquad 4+4S = 1-S$$

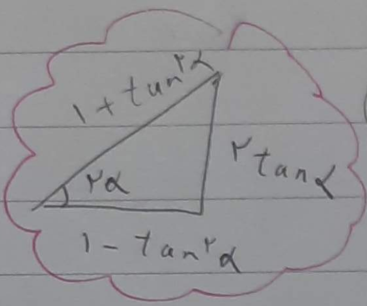
$$5S = -3 \qquad S = -\frac{3}{5}$$

$$C = -\frac{4}{5}$$

ربع سوم

$\tan\frac{x}{2} = \tan\alpha$

$\tan 2\alpha = \frac{3}{4} \Rightarrow$ مثلث خیام




$\tan 2\alpha = \frac{2\tan\alpha}{1-\tan^2\alpha}$

$$\frac{3}{4} = \frac{2t}{1-t^2} \Rightarrow 3-3t^2 = 8t$$

$$3t^2+8t-3=0$$

ردی $\quad t^2+8t-9=0$

$(t+9)(t-1)$

$t = -\frac{9}{3}$

$t = \frac{1}{3}$

مقدار صحیح $\Rightarrow \boxed{\tan\alpha = -3}$

۹

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

$$\frac{2\times 2\sin\frac{\alpha}{2}\cos\frac{\alpha}{2}}{\underbrace{1-\cos^2\frac{\alpha}{2}}_{\sin^2\frac{\alpha}{2}}+\sin^2\frac{\alpha}{2}} = \frac{\cancel{4}^{2}\ \cancel{\sin\frac{\alpha}{2}}\cos\frac{\alpha}{2}}{\cancel{2}\times\sin^{\cancel{2}}\frac{\alpha}{2}} = \frac{2\cos\frac{\alpha}{2}}{\sin\frac{\alpha}{2}} =$$

$$2\cot\frac{\alpha}{2} \Rightarrow k=2$$

MAHAN

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$\sin\alpha = \frac{\sqrt{2}}{10}$ [illegible] $\cos\alpha = \frac{-7\sqrt{2}}{10}$

**10**

$\cos\left(\frac{3\pi}{4}+\alpha\right) = ?$ ~~[illegible]~~

**5**

$\cos\frac{3\pi}{4}\cos\alpha - \sin\frac{3\pi}{4}\cdot\sin\alpha$

$-\frac{\sqrt{2}}{2} \times -\frac{7\sqrt{2}}{10} - \frac{\sqrt{2}}{2} \times \frac{\sqrt{2}}{10} \Rightarrow \frac{1}{5} - \frac{1}{10} = \frac{1}{10}$

$\cos\left(\frac{11\pi}{4}+\alpha\right) = -\left(\cos\alpha\cos\frac{\pi}{4} + \sin\alpha\sin\frac{\pi}{4}\right)$

$\rightarrow \frac{-\sqrt{2}}{2}(\cos\alpha+\sin\alpha)$        $\cos\alpha = \frac{-7\sqrt{2}}{10}$

$\hookrightarrow \frac{-\sqrt{2}}{2}\left(\frac{-7\sqrt{2}}{10}+\frac{\sqrt{2}}{10}\right) = \frac{3}{5}$

$۶)\ A = \sqrt{۳} \times \frac{-\sqrt{۳}}{۲} \times \sin(۲۷۰-۲۷) - \sqrt{۲} \times \frac{\sqrt{۲}}{۲} \cos(۱۸۰-۲۷)$

$\rightarrow \frac{۵}{۲} \cos(۲۷) \rightarrow$ برابر $\frac{۵}{۲}$

$۷)\ f\left(\frac{\pi}{۲۴}\right) = ۱۶\cos^{۲}\left(\frac{\pi}{۱۲}\right) \cos^{۲}\left(\frac{\pi}{۶}\right) \cos^{۲}\left(\frac{\pi}{۳}\right) \cos^{۲}\left(\frac{۲\pi}{۳}\right)$

$\cos^{۲}\frac{\pi}{۱۲} = \frac{۱+\cos\frac{\pi}{۶}}{۲} = \frac{۲+\sqrt{۳}}{۴}$

$\downarrow$

$۱۶\left(\frac{۲+\sqrt{۳}}{۴}\right) \times \frac{۳}{۴} \times \frac{۱}{۴} \times \frac{۱}{۴}$

$= \frac{۳(۲+\sqrt{۳})}{۱۶}$