فاطمه متقی - ۴۸

۱۴,۵ «به نام خدا»

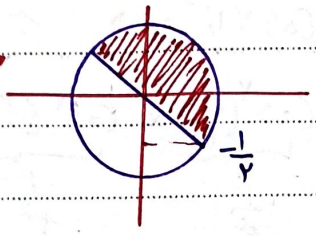
۱) $\cot\alpha = \frac{\cos\alpha}{\sqrt{1-\cos^2\alpha}} \Rightarrow \frac{\cos\alpha}{|\sin\alpha|} = \frac{\cos\alpha}{\sin\alpha} \Rightarrow \sin\alpha > 0$ ناحیه اول یا دوم

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

$\cos\alpha > 0: \frac{1-\sin\alpha}{\cos\alpha} = \frac{1-\sin\alpha}{\cos\alpha}$ ✓ $\Rightarrow$ ناحیه اول

$\cos\alpha < 0: \frac{-1-\sin\alpha}{\cos\alpha} = \frac{\sin\alpha+1}{\cos\alpha}$ ×

$\Rightarrow \cos\alpha > 0$ ۶

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

$-\frac{1}{2} < \sin 2x \leq 1$ ۵

$-\frac{1}{2} < \frac{m-1}{4} \leq 1 \rightarrow -2 < m-1 \leq 4 \rightarrow -1 < m \leq 5 \Rightarrow m \in (-1, 5]$

۳) $\tan x + \cot x = \frac{\sin\alpha}{\cos x} + \frac{\cos x}{\sin x} = -3 \Rightarrow \cos x \sin x = \frac{-1}{3}$

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

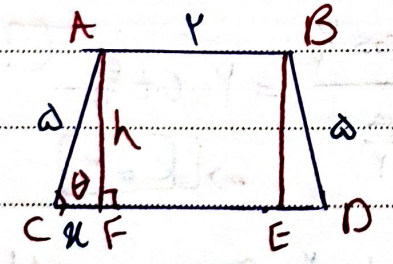
$\cos^2 x + \sin^2 x = 1$, $-\sin x \cos x = +\frac{1}{3}$

$\Rightarrow \frac{1}{\cos^3 x + \sin^3 x} = \frac{3}{4} \times \frac{1}{\cos x + \sin x} = A$ ۱,۷۵

به توان دو $\rightarrow A^2 = \frac{9}{16} \times \frac{1}{(\cos^2 x + \sin^2 x + 2\cos x \sin x)}$

$\cos^2 x + \sin^2 x = 1$, $2\cos x \sin x = -\frac{2}{3}$

$A^2 = \frac{9}{\frac{16}{3}} = \frac{27}{16} \Rightarrow A = \frac{3\sqrt{3}}{4}$

۴) 

$\cos\theta = \frac{x}{5} = \frac{3}{10} \rightarrow x = 3$ ۵

$\hookrightarrow 5^2 = 3^2 + h^2 \rightarrow h = 4 \rightarrow \hat{C} = \hat{D}$

$\hookrightarrow CF = ED = 3$, $BE = AF = 4 \rightsquigarrow ABEF$ مستطیل

$\rightarrow AB = FE = 2 \rightarrow$ قاعده بزرگ $= 8 \rightarrow S_{\text{ذوزنقه}} = \frac{8+2}{2} \times 4 \Rightarrow S_{\square} = 20$

به نام خدا

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$\tan\left(\frac{3\pi}{2}+15^\circ\right)\times\tan(-\pi+15^\circ)-\sin 15^\circ\cos\left(\frac{3\pi}{2}-15^\circ\right)$ (۵

$\hookrightarrow(-\cot 15^\circ\tan 15^\circ)-(\sin 15^\circ\times-\sin 15^\circ)=-1+\sin^2 15^\circ=-\cos^2 15^\circ\Rightarrow k=-1$

$A=\sqrt{3}\times\frac{-\sqrt{3}}{2}\times\sin\left(\frac{3\pi}{2}-47^\circ\right)-\left(\sqrt{2}\times\frac{\sqrt{2}}{2}\times\cos(\pi-47^\circ)\right)$ (۶

$A=\frac{3}{2}\times\cos 47^\circ-\left(-\cos 47^\circ\right)=\frac{5}{2}\cos 47^\circ\rightarrow$ بزرگ $\frac{5}{2}$

$f\left(\frac{\pi}{24}\right)=16\cos^2\left(\frac{\pi}{12}\right)\times\cos^2\left(\frac{\pi}{6}\right)\times\cos^2\left(\frac{\pi}{3}\right)\times\cos^2\left(\frac{2\pi}{3}\right)$ (۷

$16\left(\frac{1+\cos\left(\frac{\pi}{6}\right)}{2}\right)$ $\frac{3}{4}$ $\frac{1}{4}$ $\frac{1}{4}$

$\Rightarrow\frac{3}{4}\left(\frac{2+\sqrt{3}}{4}\right)\Rightarrow\frac{6+3\sqrt{3}}{16}$

$\frac{1-\sin\alpha}{1+\sin\alpha}=4\rightarrow 1-\sin\alpha=4+4\sin\alpha\rightarrow 5\sin\alpha=-3\Rightarrow\sin\alpha=\frac{-3}{5}$ (۸

$\cos\alpha=\frac{-4}{5}$

$\tan\frac{\alpha}{2}=\frac{\sin\frac{\alpha}{2}}{\cos\frac{\alpha}{2}}=\sqrt{\frac{1-\cos\alpha}{1+\cos\alpha}}\times\frac{\sqrt{1-\cos\alpha}}{\sqrt{1-\cos\alpha}}\Rightarrow\frac{|1-\cos\alpha|}{|\sin\alpha|}$ (۱۰/۱۵)

$\Rightarrow\frac{-(1-\cos\alpha)}{\sin\alpha}=\frac{+\left(1+\frac{4}{5}\right)}{+\frac{3}{5}}=\frac{\frac{9}{5}}{\frac{3}{5}}=3$

$\frac{\sin^2\theta+(1-\cos^2\theta)}{\sin\theta(1-\cos\theta)}=\frac{2\sin^2\theta}{\sin\theta(1-\cos\theta)}=\frac{4\sin\frac{\theta}{2}\cos\frac{\theta}{2}}{2\sin^2\frac{\theta}{2}}=2\cot\frac{\theta}{2}$ (۹

$\Rightarrow k=2$

$11\pi\rightarrow\frac{44\pi}{4}+\frac{3\pi}{4}\Rightarrow\cos\left(\frac{3\pi}{4}+\alpha\right)\Big/\cos^2\alpha=1-\sin^2\alpha\rightarrow 1-\frac{2}{100}=\frac{98}{100}\rightarrow\cos\alpha=\frac{-\sqrt{2}}{10}$ (۱۰

$\cos\frac{3\pi}{4}\cos\alpha-\sin\frac{3\pi}{4}\sin\alpha\Rightarrow\frac{+\sqrt{2}}{2}\times\frac{+7\sqrt{2}}{10}-\frac{\sqrt{2}}{2}\times\frac{\sqrt{2}}{10}$ (۵)

$\hookrightarrow\frac{7}{10}-\frac{1}{10}=\frac{6}{10}=0/6=\frac{3}{5}$

Arman

۸) $1-\sin\alpha = F+F\sin\alpha \rightarrow \sin\alpha = \frac{-\mu}{\Delta}$, $\cos\alpha = \frac{-F}{\Delta}$ $\quad \cos^2\frac{\alpha}{2} = \frac{1+\cos\alpha}{2} = \frac{1}{10}$

$1+\tan^2\frac{\alpha}{2} = \frac{1}{\cos^2\frac{\alpha}{2}} \rightarrow \tan\frac{\alpha}{2} = \pm\mu$ $\xrightarrow[\text{بیشتر}]{\text{با توجه به اینکه } \frac{\alpha}{2}}$ $\tan\frac{\alpha}{2} = -\mu$