۱) $\cot\alpha = \frac{\cos\alpha}{\sqrt{1-\cos^2\alpha}}$ $\quad \frac{1}{\sqrt{\cos^2\alpha}} - \frac{1}{\cot} = \frac{1-\sin\alpha}{|\cos\alpha|}$ (۱۴,۷۵)

$\frac{\cos\alpha}{\sin\alpha} = \frac{\cos}{\sqrt{\sin^2\alpha}} \to \sqrt{\sin^2} = \sin \Rightarrow \sin > 0$

$\frac{1}{\sqrt{\cos^2\alpha}} - \frac{1}{\frac{\cos\alpha}{\sin\alpha}} = \frac{1-\sin\alpha}{|\cos\alpha|}$

$\hookrightarrow \frac{1}{\sqrt{\cos^2\alpha}} - \frac{\sin\alpha}{\cos\alpha} \Rightarrow \sqrt{\cos^2\alpha} = \cos\alpha \Rightarrow \cos\alpha > 0$] $\Rightarrow$ جواب اول (۵)

۲) $-\frac{\pi}{4} < 2x < \frac{3\pi}{4} \to -\frac{1}{2} < \sin 2x \leq 1 \to -\frac{1}{2} < \frac{m-1}{3} \leq 1 \to -1 < m \leq 3$ (۵)

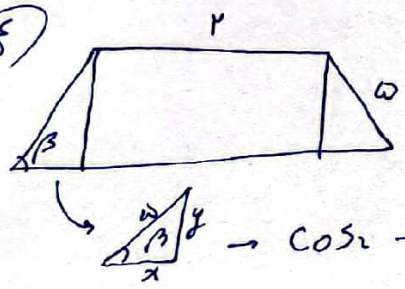
۳) $\frac{1}{\sin x \cdot \cos x} = -2 \to \sin x \cdot \cos x = -\frac{1}{2}$

$\cos^2 x + \sin^2 x \cdot (\cos x + \sin x)(\sin^2 x + \cos^2 x - \sin x \cdot \cos x) = -\frac{2\sqrt{2}}{3}$ (۱)

$A^2 = 1 + 2\sin x \cos x = 1 + 2(-\frac{1}{2}) = \frac{1}{2} \to A = \pm\frac{1}{\sqrt{2}} \xrightarrow{A<0} A = -\frac{1}{\sqrt{2}}$

$\frac{1}{\cos^2 x + \sin^2 x} = -\frac{3}{2\sqrt{2}}$ جواب سوال

۴)



$\to$ محیط $= 2 + 3 + 3 + 8 = 16$

$\to \cos\beta = \frac{x}{5}$ ، $x = 3$ ، $y = 4$

$\to$ مساحت $= \frac{(3+8)\times 4}{2} = 22$ (۵)

۵) $\tan(2\pi) = \tan(2\pi - 2\pi) = \tan(-\pi) = -\tan(\pi)$

$\tan(-14\pi) = -\tan(14\pi) = -(-\tan(\pi)) = \tan(\pi)$

$\sin(19\pi) = \sin(10\pi - 4\pi) = \sin(12\pi) = \sin(3\pi - 2\pi) = \sin(\pi)$ (۵)

$\cos(25\pi) = \cos(24\pi - 2\pi) = \cos(-10\pi) = -\sin(\pi)$

$-\tan(7\pi)\tan(\pi) - (-\sin(\pi)\sin(\pi)) = -1 + \sin^2\pi = -1 + 1 - \cos^2(\pi) = -\cos^2(\pi)$

$= (k=1)$

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(۶) $A = -\frac{۳}{۴} \times -\cos ۲V + \frac{۲}{۴}\cos ۲V = \frac{۳}{۴}\cos ۲V \longrightarrow$ بزرگترین $\frac{۳}{۴}$

۶

(۷) $f(x) = ۱۴\cos^۲(۳x)\cos^۲(۶x)\cos^۲(۱۲x)\cos^۲(۲۴x)$

$f(\frac{\pi}{۳۶}) = ۱۴\cos^۲(\frac{\pi}{۱۲})\cos^۲(\frac{\pi}{۶})\cos^۲(\frac{\pi}{۳})\cos^۲(\frac{۲\pi}{۳})$ ۶

$= ۱۴\cos^۲(۱۵)\cos^۲(۳۰)\cos^۲(۶۰)\cos^۲(۱۲۰)$

$= \frac{۳}{۴}\cos^۲(۱۵) \longrightarrow \frac{۳}{۴}(\frac{۱+\cos ۳۰}{۲}) = \frac{۷+۳\sqrt{۳}}{۱۶}$

(۸) $۱-\sin x = ۴+۴\sin x \longrightarrow ۵\sin x = -۳ \longrightarrow \sin = -\frac{۳}{۵}$

$\sin^۲+\cos^۲=۱ \longrightarrow \frac{۹}{۲۵}+\cos^۲=۱ \longrightarrow \cos^۲=\frac{۱۶}{۲۵} \longrightarrow \cos = -\frac{۴}{۵}$

$\tan x = \frac{-\frac{۳}{۵}}{-\frac{۴}{۵}} = \frac{۳}{۴}$

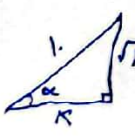
$\tan x = \frac{۲\tan\frac{x}{۲}}{۱-\tan^۲\frac{x}{۲}} \xrightarrow{\tan\frac{x}{۲}=z} \frac{۳}{۴} = \frac{۲z}{۱-z^۲} \longrightarrow \begin{cases} z=-۳ \times \\ z=\frac{۱}{۳} \checkmark \end{cases}$

(۹) $\frac{۲\sin\frac{\theta}{۲}\cos\frac{\theta}{۳}}{۲\sin^۲\frac{\theta}{۲}} + \frac{۲\cos^۲\frac{\theta}{۳}}{۲\sin\frac{\theta}{۲}\cos\frac{\theta}{۳}} = \cot\frac{\theta}{۲} + \cot\frac{\theta}{۲} = ۲\cot\frac{\theta}{۲}$

$\rightarrow k=۲$ ۶

(۵۵) $\cos(\frac{۱۱\pi}{۶}+\alpha) = \cos(۲\pi-\frac{\pi}{۶}+\alpha) = -\cos(\alpha-\frac{\pi}{۶}) = -(\cos\alpha\cos\frac{\pi}{۶}+\sin\alpha\sin\frac{\pi}{۶})$

$= -\frac{\sqrt{۳}}{۲}(\cos\alpha+\sin\alpha) \Rightarrow \cos(\frac{۱۱\pi}{۶}+\alpha) = \frac{\sqrt{۳}}{۲}(-\frac{۷\sqrt{۲}}{۱۰}+\frac{\sqrt{۲}}{۱۰}) = \frac{۳}{۵}$ ۶



$\rightarrow k = \sqrt{۹۸} \longrightarrow \cos\alpha = -\frac{۷\sqrt{۲}}{۱۰}$

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