(۷)

$\sin\alpha = ۲\cos\alpha$

$\xrightarrow{1-\sin^۲\alpha=\cos^۲\alpha}$ $(\sin\alpha)^۲ = (۲\cos\alpha)^۲$

$1 - ۴\cos^۲\alpha = \cos^۲\alpha$

$1 = ۵\cos^۲\alpha$

$\cos^۲\alpha = \frac{1}{۵}$

$\cos\alpha = \frac{\pm 1}{\sqrt{۵}}$ ← α ربع سوم

$\cos\alpha = \frac{-1}{\sqrt{۵}}$

$\cos\alpha = \frac{-\sqrt{۵}}{۵}$

ربع α: $\Longrightarrow$ $\sin\alpha <۰$، $\cos\alpha <۰$، $\tan\alpha >۰$، $\cot\alpha >۰$

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(۸)

$\tan ۶۰^\circ$ = شیب خط

$\sqrt{۳} = m$ (شیب)

$۲mx + (m^۲-۱)y = ۲$

$y = \frac{-۲m}{(m^۲-۱)}x + \frac{۲}{(m^۲-۱)}$ $\Rightarrow$ شیب $= \frac{-۲m}{(m^۲-۱)}$

$\frac{-۲m}{(m^۲-۱)} = \sqrt{۳}$ $\longrightarrow$ $\sqrt{۳}m^۲ + ۲m - \sqrt{۳} = ۰$

$\Delta = ۴ + ۱۲ = ۱۶$

$m_۱ = \frac{-۲-۴}{۲\sqrt{۳}} = \frac{-۶}{۲\sqrt{۳}} = \frac{-۳}{\sqrt{۳}} = -\sqrt{۳}$

$m_۲ = \frac{-۲+۴}{۲\sqrt{۳}} = \frac{۲}{۲\sqrt{۳}} = \frac{۱}{\sqrt{۳}} = \frac{\sqrt{۳}}{۳}$

$m_۱ - m_۲ = \frac{۲\sqrt{۳}}{۳} - \left(\frac{-۱\sqrt{۳}}{۳}\right) = \frac{۳\sqrt{۳}}{۳}$

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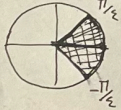
(۹)



$\tan\left(\frac{\pi}{۴} - \alpha\right) = \frac{۱-m}{۲+m}$

$\frac{-\pi}{۴} > \alpha > \frac{\pi}{۴}$

$\alpha(-۱)$: $\frac{-\pi}{۴} < \alpha - \frac{\pi}{۴} < \frac{\pi}{۴}$

$۰ < \tan\left(\frac{\pi}{۴} - \alpha\right) < +\infty$ $\Longleftarrow$ $۰ < \frac{\pi}{۴} - \alpha < \frac{\pi}{۲}$ (ربع اول)

$A: \frac{۱-m}{۲+m} > ۰$

m	-۲		۱
A	$-$	$+$	$-$

$\Longrightarrow$ $-۲ < m < ۱$

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(۱۰)

$\tan(۲۰۰^\circ)\cos(۲۱۰^\circ) + \tan(۲۷۰^\circ)\sin(۱۷۰^\circ) = ?$

$\tan\left(۲\pi - \frac{\pi}{۴}\right)\cos\left(\frac{۲\pi}{۲} - \frac{\pi}{۶}\right) + \tan\left(\frac{۵\pi}{۲} + \frac{\pi}{۳}\right)\sin\left(۹\frac{\pi}{۲} + \frac{\pi}{۳}\right) = ?$

$\left(-\tan ۶۰^\circ\right)\times\left(-\sin ۶۰^\circ\right) + \left(-\cot ۳۰^\circ\right)\times\left(\cos ۳۰^\circ\right) =$

$\left(-\sqrt{۳}\right)\times\left(\frac{-\sqrt{۳}}{۲}\right) + \left(-\sqrt{۳}\right)\times\left(\frac{۱}{۲}\right) = \frac{۳}{۲} + \left(\frac{-\sqrt{۳}}{۲}\right) = \frac{۳-\sqrt{۳}}{۲}$

حسنی سلوت حل
یازدهم (A)
تکلیف سری ۲۴
شکلات

$S = a \times b \times \sin\theta = 8\sqrt{2}$ (مساحت متوازی‌الاضلاع)

$\sin 150 = \sin 30 = \frac{1}{2} \Longrightarrow \sin\theta = \frac{1}{2}$

$\frac{a}{b} = \frac{2}{3} \quad a = \frac{2}{3}b$

$a \times b = 2 \times 8\sqrt{2}$

$b \times \frac{2}{3}b = \frac{2}{3}b^2 = 8\sqrt{2} \times 2 \longrightarrow b^2 = 8\sqrt{2} \times 2 \times \frac{3}{2} = 4^2 \times 2 \longrightarrow b = 9\sqrt{2} \rightarrow a = 6\sqrt{2}$

محیط: $2(a+b) = 2(9\sqrt{2}+6\sqrt{2}) = 2 \times 15\sqrt{2} = 30\sqrt{2}$

$S_{\hat{ABC}} - S_{\hat{ADE}} = 105$

$S_{\hat{ABC}}: \frac{6(4+3)}{2} \times \sin\hat{A} = \frac{42}{2}\sin A$

$S_{\hat{ADE}}: \frac{4(6+2)}{2} \times \sin\hat{A} = 16\sin A$

$\frac{42}{2}\sin\hat{A} - 16\sin = 105 = \frac{7}{4}$

$\frac{7}{2}\sin\hat{A} = \frac{7}{4} \Longrightarrow \sin A = \frac{1}{2}$

$1 - \sin^2 A = \cos^2 \Longrightarrow \cos A = \frac{\sqrt{3}}{2}$ (زاویه حاده $\hat{A}$)

$\tan\hat{A} = \frac{\sin\hat{A}}{\cos\hat{A}} = \frac{\frac{1}{2}}{\frac{\sqrt{3}}{2}}$

$\tan\hat{A} = \frac{\sqrt{3}}{3}$

$\frac{|\sin\alpha|}{\cos\alpha} = \frac{-1}{\cot\alpha} \rightarrow \frac{|\sin\alpha|}{\cos\alpha} = -\tan\alpha \rightarrow \boxed{\sin\alpha < 0}$: ناحیه سوم یا چهارم

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

$\frac{1}{|\cos\alpha|} - \frac{\sin\alpha}{\cos\alpha} = \frac{1}{|\cos\alpha|} + \frac{\sin\alpha}{|\cos\alpha|} \rightarrow \frac{\sin\alpha}{|\cos\alpha|} = \frac{-\sin\alpha}{\cos\alpha} \rightarrow \boxed{\cos\alpha < 0} \Rightarrow$ ناحیه سوم

$\tan\left(\frac{\pi}{2} - \alpha\right) = ? = \tan\left(\frac{\pi}{2} + \beta - \pi\right) = \tan\left(\beta - \frac{\pi}{2}\right) = -\cot\beta = \boxed{\frac{-3}{4}}$

$\tan\beta = \frac{150}{2} = \frac{3}{4} \rightarrow \cot\beta = \frac{4}{3}$ طبق شکل

$180 - \alpha = \beta \rightarrow -\alpha = \beta - \pi$ زاویه خط با جهت مثبت محور xها (زاویه حاده)

$\frac{2\cos(2340^\circ) - 2\sin(150^\circ)}{\sin(2.2^\circ) - \cos(2910^\circ)} = \frac{2\cos\left(13\frac{\pi}{2} - 22^\circ\right) - 2\sin(\pi - 22^\circ)}{\sin(\pi + 22^\circ) - \cos\left(15\frac{\pi}{2} + 22^\circ\right)} = \frac{-2\sin 22^\circ - 2\sin 22^\circ}{-\sin 22^\circ - \sin 22^\circ} =$

$= \frac{(-2)\sin 22^\circ}{(-2)\sin 22^\circ} = \boxed{\frac{5}{2}}$

α: ربع سوم ، $\cos\alpha = \frac{2}{3}$ $\quad \sin\alpha = \frac{-\sqrt{5}}{3} \quad \tan\alpha = \frac{-\sqrt{5}}{2} \quad \cot\alpha = \frac{-2}{\sqrt{5}}$

$\sin\alpha < 0$
$\cos\alpha > 0$
$\tan\alpha < 0$
$\cot\alpha < 0$

$1 - \cos^2 = \sin^2 \rightarrow \sin^2\alpha = \frac{5}{9} \rightarrow \sin\alpha = \frac{\pm\sqrt{5}}{3} \xrightarrow{\sin\alpha < 0} \frac{-\sqrt{5}}{3}$

$\tan\alpha = \frac{\sin\alpha}{\cos\alpha} = \frac{\frac{-\sqrt{5}}{3}}{\frac{2}{3}} = \frac{-\sqrt{5}}{2}$

$\cot\alpha = \frac{1}{\tan\alpha} = \frac{-2}{\sqrt{5}} = \frac{-2\sqrt{5}}{5}$

$\frac{\sin\left(\frac{\pi}{2} + \alpha\right)}{|\tan^2\alpha - 1|} \xrightarrow{+\cos\alpha} \frac{-\sin\left(\alpha - \pi\right)}{} \xrightarrow{-\sin\alpha} = \frac{\cos\alpha + \sin\alpha}{\frac{1}{4}} =$

$= \left(\frac{2}{3} + \left(\frac{-\sqrt{5}}{3}\right)\right) \times 4 = \frac{4}{3}(2 - \sqrt{5}) = \frac{8 - 4\sqrt{5}}{3} = \frac{5 - \sqrt{5}}{3}$